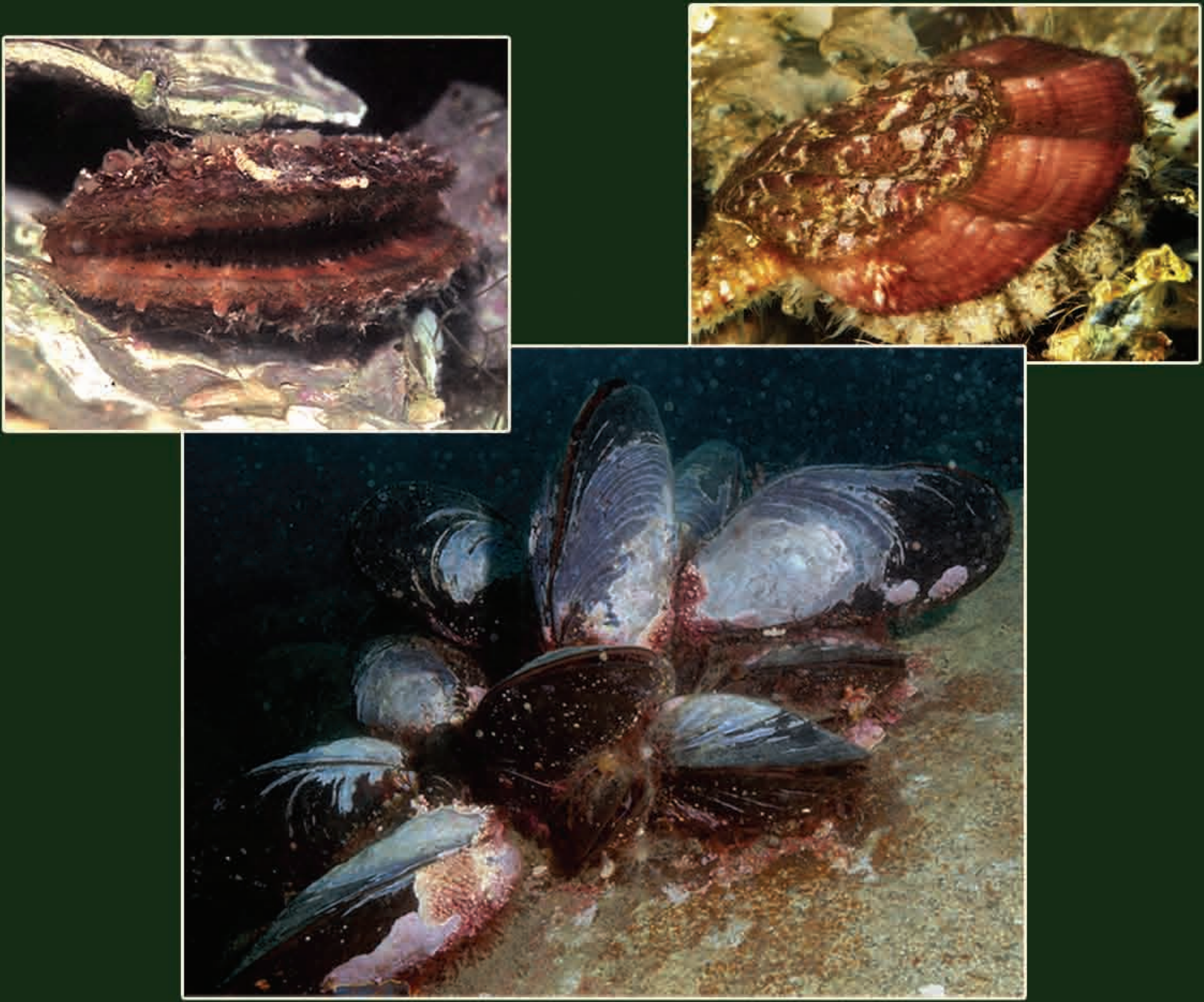
K.A. Lutaenko and R.G. Noseworthy

CATALOGUE OF THE LIVING BIVALVIA

OF THE CONTINENTAL COAST
OF THE SEA OF JAPAN (EAST SEA)



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FAR EAST BRANCH
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RUSSIAN FAR EAST MALACOLOGICAL SOCIETY

K.A. Lutaenko and R.G. Noseworthy

CATALOGUE OF THE LIVING BIVALVIA OF THE CONTINENTAL COAST OF THE SEA OF JAPAN (EAST SEA)

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ДАЛЬНЕВОСТОЧНОЕ МАЛАКОЛОГИЧЕСКОЕ ОБЩЕСТВО

К.А. Лутаенко, Р.Дж. Ноусворти

КАТАЛОГ СОВРЕМЕННЫХ ДВУСТВОРЧАТЫХ МОЛЛЮСКОВ КОНТИНЕНТАЛЬНОГО ПОБЕРЕЖЬЯ ЯПОНСКОГО МОРЯ

Владивосток
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К.А. ЛУТАЕНКО, Р.ДЖ. НОУСВОРТИ. Каталог современных двустворчатых моллюсков континентального побережья Японского моря. – Владивосток: Дальнаука, 2012. 247 с.

Каталог современных двустворчатых моллюсков континентального побережья Японского моря (от Пусана на юге до Татарского пролива на севере), составленный впервые, включает 367 видов и подвидов из 57 семейств. Для каждого вида дано региональное распространение в пределах Кореи (по провинциям) и исторической области Приморье (для двух районов – южного и среднего/северного), уточненная зонально-географическая характеристика, для ряда видов – замечания о систематике и/или распространении и для 197 видов приводятся ссылки на работы по экологии и биологии моллюсков региона (включая статьи в журналах, сборниках, материалах конференций и коллективные монографии). Каталог сопровождается фотоиллюстрациями 192 видов.

K.A. LUTAENKO and R.G. NOSEWORTHY. Catalogue of the Living Bivalvia of the Continental Coast of the Sea of Japan (East Sea). – Vladivostok: Dalnauka, 2012. 247 p.

This is a catalogue of the Recent bivalve mollusks of the continental coast of the Sea of Japan/East Sea (from Busan in the south to Tatarsky Strait in the north), compiled for the first time, which contains 367 species and subspecies belonging to 57 families. For each species, the regional distribution in Korea, by provinces, and in the historical region of Primorye in Russia, for two areas – southern and middle/northern Primorye, is given, as well as verified zonal-geographical characteristics, and taxonomic and/or distributional notes. For 197 species, bibliographic references related to all aspects of biology and ecology of the region, including journal and book articles, proceedings of conferences, and collective monographs, are provided. The catalogue is supplemented with photographs of 192 species and 49 drawings of bivalves.

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Introduction

The Sea of Japan ("East Sea" in Korea) is a marginal, deep basin enclosed by an island arc which separates it from the Pacific Ocean. The sea is directly connected with the Sea of Okhotsk by the Tatarsky (Mamiya) Strait, sometimes called "the Gulf of Tartary", and with the East China Sea by the Tsushima and Korea Straits, between Korea and Kyushu, Japan. Tsugaru Strait, between Honshu and Hokkaido, and La Perouse Strait (or Soya), between Sakhalin and Hokkaido, connect the sea with the Pacific Ocean. This sea is rather isolated as the straits are shallow; the maximum depth of Korea Strait is 150 m, and Tsugaru Strait 200 m. Nevelskogoko Strait (northernmost Tatarsky Strait) has a sill depth of 5 m, and La Perouse Strait 53 m. This suggests that the deep basin of the Sea of Japan/East Sea has no exchange with deep Pacific waters, the maximum depth of the sea being 3670–3695 m in its eastern part. The Sea of Japan/East Sea is unique among the enclosed seas of the northwestern Pacific in having strong ocean currents in the form of powerful streams. The sea is divided by a frontal zone, or "polar front", into two distinct areas: the southeastern warm-water area washed by the Tsushima Current with three branches [Kawabe, 1982], and the northwestern area dominated by the cold Liman(ian), Primorskoye, and North Korean Currents [Nishimura, 1983; Yurasov and Yarichin, 1991]. This division is clearly reflected in the biota and biogeography of the sea. Biogeographically, the Sea of Japan/East Sea belongs to two regions (geographical zones or subzones): boreal, or temperate, and subtropical.

Taxonomic inventories are an essential requirement and a top priority for biodiversity science. Documenting diversity through monographs, taxonomic revisions, and checklists is a major goal of taxonomic and biodiversity research. The need for taxonomy has never been greater as we still cannot answer the simplest question about biodiversity: "How many species are there?" [Wheeler and Cracraft, 1997]. We do not even know whether the number of valid named Recent species of mollusks is in the order of 45,000 or 130,000 [Bouchet, 2006]. The total number of marine bivalves is currently about 8,000 species. However, new species of marine bivalves are being described every month, with 389 species for the years 2000–2009 [Mikkelsen, 2011]. The bivalve molluscan diversity of the entire Sea of Japan/East Sea is unknown. According to literature data, species richness of bivalve faunas in large bays and other marine localities varies from 88 (Vostok Bay, Russia) to 211 (Sado Island, Japan) (see Table). Crame [2000] estimated that about 256 living species exist in Far Eastern Russia (Sea of Okhotsk, Kamchatka, Sakhalin, northern Sea of Japan/East Sea, and part of the Bering Sea, i.e., between 43º and 66º N). Scarlato [1981] in his comprehensive monograph on the bivalves of temperate latitudes of the Northwest Pacific listed 279 species and subspecies. In the "East China Sea region", between 22º and 41º N, which includes the East China Sea itself, the Yellow Sea, southern Honshu, Taiwan, and Hong Kong, 1176 species are believed to exist [Crame, 2000]. For the seas along

Species richness of bivalve molluscan faunas in bays and some other localities in the Sea of Japan/East Sea

Locality	Species richness	Reference
Wakasa Bay (Honshu)	207	Ito [1990]
Tsukumo Bay (Noto Peninsula, Honshu)	104	Habe [1973]
Ichikawa Prefecture (around Noto Peninsula)	119	Ito *et al.* [1986]
Sado Island	211	Kuroda [1957]; Honma and Kitami [1978, 1979, 1995]
Mano Bay (Sado Island)	103	Ito [1978]
Yeongil Bay (Korea)	98	Lutaenko *et al.* [2003; 2006]
Possjet Bay (Russia)	97	Golikov and Scarlato [1967]; Scarlato [1981]
Vostok Bay (Russia)	88	Evseev [1981]
Amursky Bay (Russia)	119	Lutaenko [2002; 2003a]
Ussuriysky Bay (Russia)	124	Lutaenko [2005a; 2006]

the China coast, 1048 species are known [Xu, 1997]; 1472 are recorded from Japan [Higo *et al.*, 1999], and 449 are listed in the most comprehensive catalogue for Korea [Lee J.-S. and Min, 2002].

Our catalogue contains 367 species and subspecies: 312 species are known for South Korea, 50 species for North Korea, 158 species for southern Primorye, and 122 species for middle/northern Primorye in Russia (see below).

During the last decades, biodiversity in the marine and coastal zones has experienced considerable pressure. This situation is absolutely novel in the history of life on Earth and can be regarded as the Sixth Mass Extinction [Loreau, 2010]. The main causes of biodiversity loss are habitat change, climate change, invasive species (the introduction of invasive exotic species), overexploitation of biological resources, and pollution. In the area of the Sea of Japan/East Sea, the most important pressures on biodiversity are overfishing, pollution, invasive species, and climate change [Lutaenko, 2010; Threats…, 2010]. Mollusks are the second largest group in terms of the number of species in marine environments, and they play an important role in communities and ecosystems. The first step for conservation of this regional biodiversity is preparing an inventory, and this is the purpose of our catalogue.

HISTORICAL ASPECTS OF BIVALVE RESEARCH IN KOREA AND RUSSIA

The bivalve molluscan fauna of the Sea of Japan/East Sea has been studied rather comprehensively up to date, except for the deep-sea areas, but no inventory for the entire sea has appeared. Japanese malacologists published the first catalogue of Japanese mollusks in the early 1950s [Kuroda and Habe, 1952], and three detailed and updated catalogues were compiled in the 1970s and 1990s [Higo, 1973; Higo and Goto, 1993; Higo *et al.*, 1999]. The Russian bivalve molluscan fauna of the northwestern Pacific was first summarized by Scarlato [1981], and then by Kafanov [1991] and Kantor and Sysoev [2005].

Early Russian studies of bivalve mollusks in the Sea of Japan/East Sea started with Schrenck's research in the northern part of the sea and also Sakhalin Island [Schrenck, 1867]. He visited De Kastri (Chikhacheva) Bay (1854−1855), and obtained some materials from other collectors, including the first Russian collection of mollusks from middle Primorye (Olga Bay) and Peter the Great Bay (Zolotoy Rog Bay, then known as Port May, and Possjet Bay) made by Maximovich, a botanist, in 1860 and 1861. Pre-World War II faunal and taxonomic studies in the Russian sector of the Sea of Japan/East Sea were rare, e.g., Bartsch [1929], and the most significant contribution was a book by Razin [1934]. Special studies on the bivalve fauna were begun by the Zoological Institute of the then USSR Academy of Sciences in the 1950s−1960s, and the two first, most important works, were a review of Dysodonta [Scarlato, 1960] and a landmark paper on the gastropod and bivalve faunas of Possjet Bay, adjacent to the Russian−Korean border [Golikov and Scarlato, 1967]. Since that time, Peter the Great Bay, lying in the southern part of Primorsky Krai [Territory] remains the most malacologically-known area in Russian waters of the Sea of Japan/East Sea. Besides Possjet Bay [see above; also Golikov and Scarlato, 1971], within Peter the Great Bay, the Far East Marine Biosphere Reserve area [Moskaletz, 1984; 1990; Lebedev *et al.*, 2004; Lebedev, 2010; 2011], Vostok Bay [Evseev, 1976], Amursky Bay [Lutaenko, 2002; 2003a], Ussuriysky Bay [Lutaenko, 2005a; 2006], and part of Nakhodka Bay [Lutaenko, 1999] have been studied with respect to species composition and distribution of bivalve mollusks. There are many papers describing selected bivalves or dealing with their nomenclature and systematics, based on materials mostly from Peter the Great Bay and Primorye [Kafanov and Lutaenko, 1996; 1997a; b; 1998a; b; 1999; Lutaenko, 1997; 2003b; 2004a; b; 2005b; c; d; 2009; Ivanova and Lutaenko, 1998; Amano *et al.*, 1999; Lutaenko and Yakovlev, 1999].

Areas situated north of Peter the Great Bay, designated herein as middle and northern Primorye, are less malacologically studied. Scarlato's [1981] book is still a major source of faunal information whereas Romeyko [1985] published only a biogeographical and ecological analysis of the bivalve fauna based on additional materials, but the species list was never published. The latest information on bivalve mollusks found in different bays of middle and northern Primorye is more relevant [Lutaenko, 1999; Kolpakov, 2006a; b; 2008; 2009]. Evseev [1981] described in detail the Holocene history of the bivalve molluscan fauna of Vostok Bay and Middle Primorye. Taking into account other data on the Holocene mollusks of Primorye [Lutaenko, 1988; 1991; 1993a; b; Taira and Lutaenko, 1993; Jull *et al.*, 1994; Evseev and Kiyashko, 1995; Rakov *et al.*, 1996; Rakov and Tolstonogova, 1996; Rakov and Lutaenko, 1997; Rakov, 1998; Rakov and Vostretsov, 1998; Rakov and Brodiansky, 2004; and others], the north-western part of the Sea of Japan/East Sea can be regarded as one of the most studied areas in the north-western Pacific Ocean, with respect to the recent, post-glacial history of the molluscan fauna.

Important taxonomic and morphological information on the Nuculidae and Carditidae of the Russian part of the Sea of Japan/East Sea was provided by Slodkewitsch [1967], and Popov and Scarlato [1980] and Popov [1983], respectively.

A number of popular books with color illustrations and identification guides for students, fishermen, and amateurs were published by Russian authors. A chapter on bivalve mollusks was prepared by Scarlato [1976] in the identification book "*Animals and Plants of Peter the Great Bay*", which was the most studied region of the Russian coast at that time. The most important identification book in the Soviet era was "*Bivalve Mollusks of Peter the Great Bay*" by Volova and Scarlato [1980], published by the Institute of Marine Biology and Far East State University for student purposes. It contains keys, diagnoses, brief synonymies, and drawings of 94 species and subspecies known in the shallow waters of the bay, and served as an important guide for students for many years. Later, three atlases with color photographs appeared [Bogdanov and Sirenko, 1993; Yavnov, 2000; Evseev and Yakovlev, 2006], and another atlas of commercial invertebrates including bivalves, was published [Arzamastsev *et al.*, 2001]. An attempt at publication of a new guide-book for students with dichotomous keys covering bivalves of Primorye [Rakov, 2006] was unsuccessful due to numerous mistakes, low quality of illustrations, and ignorance of recent taxonomic literature.

The Korean fauna received little attention from malacologists in the nineteenth and the first half of the twentieth century. However, some mollusk collections from Korean waters had been made in the nineteenth century during the visit of H.M.S. *Samarang* under the command of Captain Edward Belcher [Belcher, 1848]. Subsequently, this collection was described in the "Zoology of the Voyage of H.M.S. *Samarang*" [Adams and Reeve, 1848]. Jeffreys [1879] described a collection of bivalves, gastropods, and brachiopods, without illustrations, from Korea Strait. However, he based his listing on the erroneous idea that a number of species from Japan or Korea were the same as those in Europe: "certain species ... are identical or varieties of European species" [l.c., p. 418]. Some other European works of the nineteenth century dealt mainly with freshwater or brackish water fauna. A review of these earlier works may be found in B.D. Lee [1956] and J.-S. Yoo [1976]. No comprehensive lists of Korean mollusks were published until the first half of the twentieth century when Japanese authors began to catalog the fauna. Nomura and Hatae [1928] discussed the distribution of 59 species of bivalves along the eastern, southern, and western coasts of Korea. Shiba [1934] published the "Catalogue of the Mollusca of Chosen (Corea)" enumerating 93 marine bivalves (excluding freshwater Unionidae and freshwater and brackish water Corbiculidae). Korean national malacological studies started in the 1950s [Lee B.D., 1956; 1958; etc.], and several identification guide-books with color photographs [Yoo, 1976; Kwon O.-K. *et al.*, 1993; 2001; Kwon O.-K. and Lee, 1999; Min D.-K. *et al.*, 2004] and lists of Korean mollusks [Je, 1989; List of Animals…, 1997; Lee J.-S. and Min, 2002; Noseworthy *et al.*, 2007] have been published. These works have contributed much to the understanding of the species composition of the molluscan fauna of the Korean Peninsula.

Several studies along the Sea of Japan/East Sea coast of Korea were devoted to regional faunas, first reports of species, and taxonomic reviews of bivalves. Lutaenko *et al.* [2003; 2006] studied in details the bivalves of Yeongil Bay, the largest bay on the eastern coast of South Korea; the same authors described molluscan beach assemblages in six localities along the eastern coast of Korea (Kangnung, Chumunjin, Taejin, Kallam, Chukpyon, Hupo and Chooksan) [Lutaenko *et al.*, 2002]. Death shell assemblages were studied on the southeastern continental shelf of Korea [Yoon S. *et al.*, 1994; Lee Y.G., 1997; 1998; Lee Y.G. *et al.*, 2008]. The distribution, shell morphology, and taxonomy of selected species of *Mytilus* [Je *et al.*, 1990; Yoo M.-S., 1992], representatives of the families Arcidae, Parallelodontidae, Glycymerididae, Mytilidae, Pectinidae, Spondylidae, Limidae, Anomiidae and Ostreidae from Ullung Island [Choe B.L. *et al.*, 1994], the families Gryphaeidae and Ostreidae from Korean waters [Qi and Choe, 2000], and additional species from Dokdo Islands [Hong B.K. *et al.*, 2008] were studied. A special publication describing and illustrating selected species was devoted to the mollusks of Busan [Son M.-H. and Hong, 2005].

Bivalve mollusks, being one of the dominant groups in intertidal and subtidal communities, were mentioned as part of various environmental and ecological studies of the eastern coast of Korea: Onsan Bay [Rho *et al.*, 1997], Ulsan Bay [Yi *et al.*, 1982], Busan coastal area [Lee J.H., 1976], Suyeong Bay, Busan [Hong S.Y. *et al.*, 1982], Naktong [Nakdong] River estuary, Busan [Bae K.S. and Yoon, 1988; 1989; Jang and Kim, 1992; Lee H.-G. *et al.*, 2005], Kijang and Haeundae, Busan [Lee I.K. *et al.*, 1984], Yong-ho Bay, Busan [Yi, 1975], Kangnun [Choi J.W. *et al.*, 2000], and Aninjin [Kim H.S. *et al.*, 1983].

North Korean waters are poorly studied with respect to the mollusk fauna, and the listing for this area is inevitably incomplete; the only Russian paper on the North Korean bivalves [Evseev, 1996] was based on the materials collected by the Soviet–Korean Geoshelf Expedition [1987–1990] [Markov *et al.*, 2008]. Only one North Korean book on mollusks is known to us: West Coast Mollusks… [1985].

FORMAT

Each species in the catalogue compises a separate numbered entry. For each species, we provide **regional distribution** (see below), **zonal-biogeographical characteristics, comments**, if necessary, to clarify taxonomic/nomenclatural complexities and geographical distribution, and a **biology and ecology** section with references. All cited references are given in square brackets whereas authors' names of species are in round brackets if necessary and are not cited in the **references** section.

We divided the continental coast of the Sea of Japan/East Sea from Busan to Tatarsky Strait into four main areas:

SK – South Korea;
NK – North Korea;
SP – South Primorye (Peter the Great Bay), Russia;
MNP – Middle and North Primorye, Russia (Fig. 1).

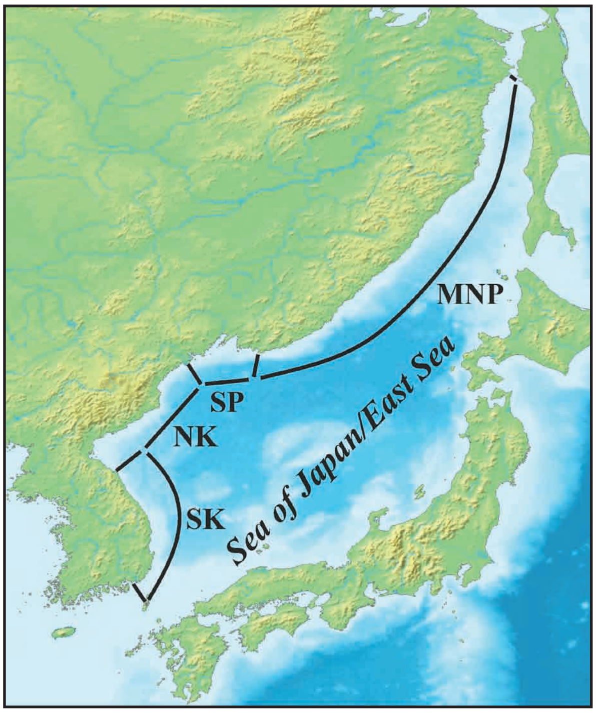

Fig. 1. A map of the Sea of Japan/East Sea with indication of the four main regions of the continental coast: **SK** – South Korea, **NK** – North Korea, **SP** – South Primorye (corresponds to Peter the Great Bay), and **MNP** – Middle and North Primorye.

The limits of the Sea of Japan in the international sense [Limits of Oceans and Seas, 1953] lie from Cape Tuik (51º45′ N) to Cape Sushcheva in the north to 33º17′ N on the Korean Peninsula in the south, thus somewhat south of Busan (35º10′ N). Along the Korean coast, there are five provinces from south to north, North Gyeongsang: Gyeongsangnam-do (short form – Gyeongnam), South Gyeongsang: Gyeongsangbuk-do (Gyeongbuk), Gangwon: Gangwon-do (Gangwon), South Hamgyung: Hamgyungnam-do (Hamnam), and North Hamgyung: Hamgyungbuk-do (Hambuk) (Fig. 2). Gangwon Province is divided between North and South Korea, and we mention each part separately under either **SK** or **NK**. Where the literature gives simply a distribution range, such as “east coast”, we have also included a citation for the publication in which it is found. The Russian coast of the Sea of Japan/East Sea belongs to two higher administrative units – Primorsky Krai ("Primorye", or sometimes called "Maritime Province") and Khabarovsky Krai; the border between them lies at Cape Tumannyi (139º2′ E). However, "Primorye" has some historical meaning, as the entire Russian part of the sea was originally called Primorye. For that reason, Russian biogeographers (e.g., Kussakin [1990]) subdivided the continental coast of the Sea of Japan/East Sea into Southern, Middle and Northern Primorye, up to the "Gulf of Tartary", or Tatarsky Strait. In the compilation of our catalogue we adopt the same scheme, but we regard the middle and northern Primorye together, as there are no exact data available to provide separate lists for those areas.

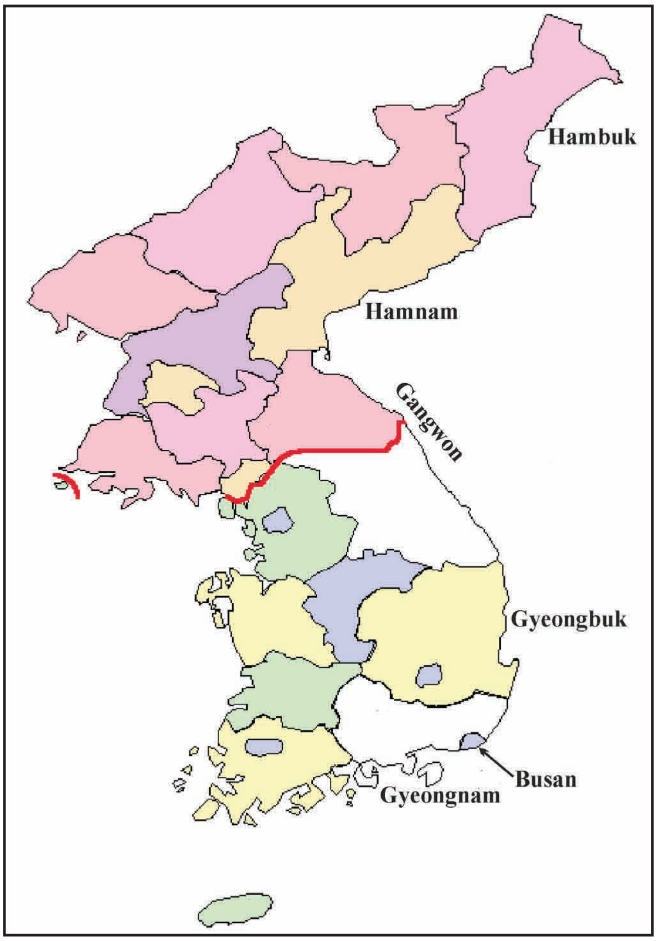

Fig. 2. A schematic map of Korea showing the provinces along the eastern coast: Gyeongnam (Gyeongsangnam-do), Gyeongbuk (Gyeongsangbuk-do), Gangwon (Gangwon-do), Hamnam (Hamgyungnam-do), and Hambuk (Hamgyungbuk-do).

For purpose of compilation of the catalogue, we used the following main sources:

SK – Kwon *et al.*, 2001; Lee J.-S. and Min, 2002; Lutaenko *et al.*, 2003; Min D.-K. *et al.*, 2004;
NK – West Coast Mollusks…, 1985; Evseev, 1996;
SP – Scarlato, 1981; Kafanov, 1991; Lutaenko, 2002; 2003a; 2005a;
MNP – Scarlato, 1981; Kafanov, 1991; Lutaenko, 1999.

Other additional papers are cited in the catalogue, if necessary. For a number of species we give brief taxonomic and biogeographic comments.

For each species, we give zonal-geographical characteristics. For information about this approach and a clarification of terms see: Scarlato [1981]; Kussakin [1990]; Lutaenko [1993a]. We recognize six major zonal-geographical groups:

1. *tropical-subtropical* (distributed southward to the Philippines, Vietnam and Indonesia);

2. *subtropical* (distributed southward to Taiwan and the northern part of the South China Sea);

3. *subtropical-lowboreal* (limited both to subtropical seas and the Sea of Japan/East Sea, southeastern Sakhalin, and the southern Kuril Islands);

4. *lowboreal* (limited to the Sea of Japan/East Sea from Peter the Great Bay, northern Korea, and northern Honshu to southwestern Sakhalin, Aniva and Terpenya bays, and the southern Kurile Islands);

5. *widely distributed boreal* (limited to the Sea of Japan/East Seas and Hokkaido to the Bering Strait, along the Asian coast, and along the northern American coast southward to California), and *circumboreal* (limited mainly to temperate latitudes, both in the Atlantic and Pacific Oceans, but also partly to subtropical and arctic zones);

6. *boreal-arctic* (limited to both the temperate zone of the Pacific Ocean and the Arctic, and partly to the temperate Atlantic).

We checked the geographical distributions of many species using numerous literature sources not cited herein, and unified zonal-geographical characteristics will be used in further analytical biogeographic reviews.

In our systematic arrangement at superfamily and family level we follow the most recent and updated classification of the Bivalvia proposed by Bieler *et al.* [2010]. Other taxa at the family level, such as subfamilies and tribes, are not included. Also we do not use orders and clades; for instance, Bieler *et al.* [2010] mention that recent molecular data do not support orders in the clade Heterodonta Neumayr, 1884, as reported in their classification[1].

In order to check the status of species and distributional records when compiling the catalogue, the following collections were consulted: CAS, MIMB, MNHN, NHM, SBMNH, ZIN, ZMFU, JNU, and the private collection of R.G. Noseworthy.

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[1] After the catalogue was finished, a new classification that summarizes the suprageneric taxonomy of the Bivalvia, for the upcoming revision of the Bivalvia volumes of the *Treatise on Invertebrate Paleontology*, Part N, was published [Carter *et al*., 2011].

BIBLIOGRAPHY ON THE BIOLOGY OF BIVALVE MOLLUSKS

The Sea of Japan/East Sea bivalve molluscan fauna is now one of the most studied in eastern Asia, not only with respect to its species composition (except for deep-water areas) but also in terms of the biology of bivalves. Three of the countries surrounding this sea have strong science infrastructure, and bivalve mollusks play an extremely important role in the development and exploitation of their marine bioresources. As a result, a large amount of literature has been published on various aspects of molluscan biology, ecology, reproduction, recruitment, morphology, aquaculture, and other topics. We decided that it is desirable and timely to summarize the numerous Korean and Russian bibliographies on the biology of bivalves living in the Sea of Japan/East Sea. In this regard, we included in the bibliography all papers available to us dealing with the biology of bivalves living in the western Sea of Japan/East Sea and in the southern part of the Korean Peninsula, i.e., living in the East China Sea or in the area known in Korea as the "South Sea of Korea" but excluding very specialized papers on biochemistry, cell and tissue biology, food processing, and other related topics. Most of the "grey literature", such as abstracts, reports, and theses, was not included in the bibliography, although some Russian and Korean papers published as extended abstracts or Russian "conference materials", often published with references and illustrations, were regarded as necessary for citation. The compilation of this bibliography aims to provide an extensive list, as comprehensive as possible, relating to the various aspects of molluscan biology in the Sea of Japan/East Sea, to facilitate access to, and diffusion of, relevant scientific works to the international community. It also aims to make Korean, Japanese, and Russian biologists aware of the huge amount of literature published on bivalve biology in the region, and previously unavailable due to language and political barriers. Of course, we were not able to collect **all** sources dealing with regional bivalve biology, but we believe that our bibliography contains the majority of the most important works. Thus, it will be very useful because of the drastic increase in the number of publications in Korea and Russia due to economic growth and scientific development.

In Russia, there is only one published bibliography on all aspects of biology of the important commercial mussel, *Crenomytilus grayanus* (Dunker, 1853), which contained Russian and some other references [Romeyko and Kafanov, 1983]; however; it is in Russian and outdated. A monograph summarizing a number of studies on the Japanese scallop *Mizuhopecten yessoensis* (Jay, 1857) [Motavkin, 1986], a similar publication on *C. grayanus* [Sveshnikov, 1983] and a book by Scarlato [1981] on bivalves of the north-western Pacific include many important references on the biology and ecology of mollusks of the Sea of Japan/East Sea; however, all three books are written in Russian.

When searching papers on the biology of bivalve mollusks, we extensively used the **Korea Science Citation Index Service** (http://ksci.kisti.re.kr/main/main.ksci), which is a platform that offers a diversity of significant information, such as the searching of research data and databases of papers that appear in major Korean journals of science and technology; and **KoreaScience, the Korean Science and Technology Gateway** (https://www.koreascience.or.kr/) − an online information resource which provides scientific and technical information such as journal articles, news, and information concerning organizations, and mainly collects resources available in the English language; it is maintained by the Korea Institute of Science and Technology Information (KISTI), the national scientific and technical information center in Korea. Also very useful was the **Russian Electronic Library** (http://elibrary.ru/), the largest Russian information portal of science, technology, and education containing full texts of more than 1900 national journals. Long-term work in the libraries of the IMB (Vladivostok), Central Library of the Far East Branch, Russian Academy of Sciences (Vladivostok), Korea Ocean Research and Development Institute (Ansan), and private libraries of the late Prof. Alexander I. Kafanov (IMB), Dr. Jong-Geel Je (formerly of KORDI), Prof. Kwang-Sik Choi (Jeju National University, Jeju Island), Dr. Eui-Hyeong Lee (formerly of Korea University, Seoul), and Dr. Eugene V. Coan (Palo Alto) allowed us to obtain necessary references for our bibliography on the biology and ecology of mollusks of the Sea of Japan/East Sea.

In most cases, Korean scientific publications have English translations of both journal and paper titles, and also English abstracts. This was not the case in Russia, especially in the Soviet era, when many books, actually collections of papers, did not have original English translations and abstracts. In this case, we indicate in square brackets “In Russian” after the reference and, in other cases, “In Russian with English abstract”. However, a majority of Soviet/Russian periodicals do have English abstracts. Moreover, many journals published by the former USSR Academy of Sciences (now Russian Academy of Sciences) have been translated into English by various publishing companies in the USA, Europe, and Russia, where papers appear with slightly different titles and different pagination. In the bibliography we include only *original* Russian versions of publications. Information about transliteration and further translation versions is given below:

Biologiya Morya – *Marine Biology*, Vladivostok (translated into English as *The Soviet Journal of Marine Biology* in 1975–1991; *Russian Journal of Marine Biology* since 1992);

Doklady Akademii Nauk SSSR – *Reports of the USSR Academy of Sciences*, Moscow; since 1992 – *Doklady Akademii Nauk* (natural science papers translated as *Doklady Biological Sciences*);

Ekologiya – *Ecology*, Ekaterinburg (translated into English as *Soviet Journal of Ecology* in 1971–1991; *Russian Journal of Ecology* since 1992);

Genetika – *Genetics*, Moscow (translated into English as *Russian Journal of Genetics*);

Gidrobiologichesky Zhurnal – *Hydrobiological Journal*, Kiev, Ukraine;

Izvestiya Rossiyskoy Akademii Nauk. Seriya Biologicheskaya – *Proceedings of the Russian Academy of Sciences. Biological Series*, Moscow (translated into English as *Biology Bulletin*);

Izvestiya TINRO – *Proceedings of the Pacific Research Institute of Fisheries and Oceanography*, Vladivostok (TINRO-Center since 1994; direct translation: "Pacific Research Fisheries Center", but still *Izvestiya TINRO* on the cover of the periodical; in some volumes in the 1940s, the English title was given as *Bulletin of the Pacific Scientific Institute of Fisheries and Oceanography*);

Okeanologiya – *Oceanology*, Moscow (translated as *Oceanology*);

Rybnoye Khozyaistvo – *Fisheries*, Moscow;

Trudy VNIRO – *Proceedings of the All-Union Research Institute of Marine Fisheries and Oceanography* and *Proceedings of the All-Russian Research Institute of Marine Fisheries and Oceanography*, Moscow; *Proceedings of VNIRO* on the cover of some issues;

Tsitologiya – *Cytology*, Leningrad; St. Petersburg (translated as *Cell and Tissue Biology*);

Voprosy Rybolovstva – *Problems of Fisheries*, Moscow;

Zhurnal Obschey Biologii – *Journal of General Biology*, Moscow;

Zoologichesky Zhurnal – *Zoological Journal*, Moscow (selected translated papers appear in various translation journals).

Abbreviations

aucct. – *auctorum*: of authors, not as proposed originally

e.g. – *exempli gratia*: for example

et al. – *et alia*: and others

ex – came from

i.e. – *id est*: that is

l.c. – *loco citato*: in the place cited

s.l. – *sensu lato*: in the broad sense

CAS – California Academy of Sciences, Invertebrate Zoology and Geology Department, San Francisco, USA

ICZN – International Code of Zoological Nomenclature

IMB – A.V. Zhirmunsky Institute of Marine Biology, Far East Branch of the Russian Academy of Sciences, Vladivostok, Russia

JNU – Jeju National University, Korea

MIMB – The Institute Museum, A.V. Zhirmunsky Institute of Marine Biology, Far East Branch of the Russian Academy of Sciences, Vladivostok, Russia

MNHN – Muséum National d'Histoire Naturelle, Paris, France

MNP – Middle and Northern Primorye

NHM – The Natural History Museum, Mollusca Section, London, UK

NK – North Korea

RGN – Ronald G. Noseworthy collection

SBMNH – Santa Barbara Museum of Natural History, Santa Barbara, USA

SK – South Korea

SP – Southern Primorye

TINRO – Pacific Research Institute of Fisheries and Oceanography (at present, TINRO-Center – Pacific Research Fisheries Center)

ZIN – Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia

ZMFU – Zoological Museum, Far East Federal University, Vladivostok, Russia (until April 2010, Far East National (or State) University)

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A CATALOGUE OF THE LIVING BIVALVIA OF THE CONTINENTAL COAST OF THE SEA OF JAPAN/EAST SEA

Subclass **PROTOBRANCHIA** Pelseneer, 1889[2]

Superfamily **NUCULOIDEA** Gray, 1824

Family **Nuculidae** Gray, 1824

1. *Nucula* (*Nucula*) *paulula* A. Adams, 1856

Regional distribution: **SK**: Gyeongnam, Ulsan.
Zonal-biogeographical characteristics: Subtropical.
Comments: A possible syntype is figured by Higo *et al.* [2001].
Biology and ecology: Noseworthy and Choi [2010].

2. *Nucula* (*Leionucula*) *tenuis* (Montagu, 1808)
Pl. 1, Figs. K–N

Regional distribution: **SK**: Gyeongbuk, Gyeongnam; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal species penetrating to subtropical waters (Yellow Sea: see: Xu [1999]; Lutaenko [2002]).
Comments: Scarlato [1981] divided this species into two subspecies: the nominate subspecies and *Nucula tenuis expansa* Reeve in Belcher, 1855. According to Bernard [1983b], *N. expansa* is a compressed form of *Nucula bellotii* A. Adams, 1865; another form, inflated, is *Nucula inflata* Hancock, 1846. At the same time, *N. bellotii* is a cold-water variant of *N. tenuis* [Bernard, 1983b] and the lack of latitudinal or ecological pattern in the distribution of the two species suggests that they should be synonymized [Coan *et al.*, 2000]. Scarlato [1981] also considered *N. inflata* as a separate species with two subspecies: boreal-arctic *N. inflata inflata* and arctic *N. inflata romboides* Scarlato, 1981, which seems to be a separable species [Coan *et al.*, 2000]. Kafanov [1991] regarded *N. bellotii* as a subspecies of *N. tenuis* with *N. inflata*, *N. expansa* and *N. inflata romboides* as its synonyms. The taxonomy of the *N. tenuis* complex is much in need of revision, using molecular studies.

Bergmans [1991] showed that genus *Ennucula* Iredale, 1931, proposed for smooth-margined *Nucula* Lamarck, 1799, is a synonym of *Leionucula* Quenstedt, 1930; we accept the latter as a subgenus of *Nucula.*

Biology and ecology: Scarlato [1981]; Lutaenko [2002]; Lutaenko *et al.* [2003]; Tokmakova *et al.* [2006].

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[2] Two Korean species of Solemyidae Gray, 1840 appear to be restricted to the southwestern area of the country, including Jeju Island [Min D.-K. *et al.,* 2004]. Kamenev [2009] recorded *Solemya* (*Petrasma*) *pervernicosa* Kuroda, 1948 from Tatarsky Strait, near Sakhalin Island, at a depth of 330 m.

3. *Nucula* (*Leionucula*) *ovatotruncata* (Scarlato in Volova et Scarlato, 1980)

Pl. 1, Figs. O, P

Regional distribution: SP; **MNP**.

Zonal-biogeographical characteristics: Lowboreal.

Comments: This species was synonimyzed with *N. tenuis* by Coan *et al.* [2000]. In MNP area, it is known from Kievka Bay (42º5′ N) [Scarlato, 1981].

Biology and ecology: Golikov and Scarlato [1967]; Lutaenko [2002].

4. *Acila* (*Acila*) *divaricata* (Hinds, 1843)

Pl. 1, Figs. A–F

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam, Busan.

Zonal-biogeographical characteristics: Subtropical-lowboreal.

Comments: *Acila* (*Acila*) *divaricata vigilia* Schenck, 1936 was listed for Gangwon and Gyeongbuk in SK [Min D.-K. *et al.*, 2004; as "*A. divaricata vigila*"]. This subspecies is a synonym of *A. divaricata* [Kafanov, 1991]. This species was recorded in Russian waters of the Sea of Japan/East Sea only around Moneron Island, south-western Sakhalin [Scarlato, 1981] and may also occur in northern Primorye. The species was recorded for Busan as "*Acila mirabilis*" (=*Nucula mirabilis* Adams et Reeve, 1850, a synonym of *A. divaricata*) [Lee J.H., 1976; Hong S.Y. *et al.*, 1982]. The holotype of *A. divaricata vigilia* is figured by Higo *et al.* [2001].

5. *Acila* (*Truncacila*) *insignis* (Gould, 1861)

Pl. 1, Figs. G–J; Text-fig. 3

Regional distribution: SK: Gangwon, Gyeongbuk; **NK**: Gangwon; **SP**; **MNP**.

Zonal-biogeographical characteristics: Subtropical-lowboreal.

Comments: According to Scarlato [1981], this species is known in Primorye north to Kievka Bay (42º5′ N); Evseev [1981] recorded it north to Neprimetnaya Bay. The holotype is figured by Johnson [1964] and Higo *et al.* [2001].

Biology and ecology: Golikov and Scarlato [1967]; Zolotarev [1976; 1980; 1989]; Evseev [1981]; Selin [1999c]; Yavnov [2000]; Lutaenko [2002]; Lutaenko *et al.* [2003]; Tokmakova *et al.* [2006].

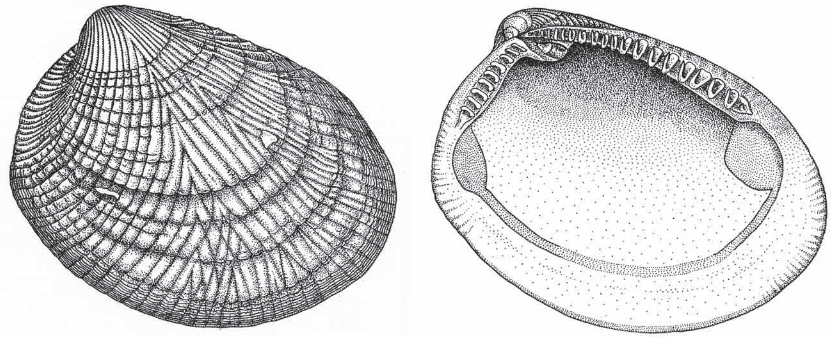

Fig. 3. *Acila* (*Truncacila*) *insignis* (Gould, 1861): SP, Possjet Bay, depth 3–5 m, shell length 14.1 mm, ZMFU 10698/Bv-965.

Superfamily **NUCULANOIDEA** H. et A. Adams, 1858

Family **Nuculanidae** H. et A. Adams, 1858[3]

6. *Nuculana* (*Nuculana*) *sadoensis* (Yokoyama, 1926)
Pl. 1, Figs. Q–T

Regional distribution: SK: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: We prefer to recognize this species as a valid one although some authors either synonymized *Leda sadoensis* Yokoyama, 1926 with *Nuculana* (*Nuculana*) *pernula* (Müller, 1779) [Coan *et al.*, 2000] or regarded it as a subspecies of the latter [Scarlato, 1981].
Biology and ecology: Scarlato [1981].

7. *Nuculana* (*Nuculana*) *pernula* (Müller, 1779)

Regional distribution: SK: Gangwon; ?**SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Comments: *Leda pernuloides* Dunker, 1882 listed for Gangwon by Korean workers [Min D.-K. *et al.*, 2004; as *Nuculana pernula pernuloides*] is a synonym of this species.
Biology and ecology: Evseev [1981]; Scarlato [1981]; Tokmakova *et al.* [2006].

8. *Nuculana* (*Nuculana*) *minuta* (Müller, 1776)
Pl. 2, Figs. E, F

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Comments: Although Scarlato [1981; as *Nuculana* (*Nuculana*) *minuta angusticauda* Scarlato, 1981] recorded this species only for northern Primorye, we recently found *Nuculana* cf. *minuta* in Peter the Great Bay [Lutaenko, 2002].

9. *Nuculana* (*Nuculana*) *kawamurai* Habe, 1961

Regional distribution: SK: "east coast" [Min D.-K. *et al.*, 2004; as *Nuculana* (*Nuculana*) *pernula kawamurai* Habe, 1961].
Zonal-biogeographical characteristics: Subtropical.

10. *Nuculana* (*Thestyleda*) *yokoyamai* (Kuroda, 1934)

Regional distribution: SK: Gangwon.
Zonal-biogeographical characteristics: Subtropical.

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[3] Record of *Nuculana* (*Nuculana*) *sachalinica* Scarlato, 1981 from Gangwon, SK [Choi J.-W. *et al.,* 2000], a bathyal species known previously only from the Sea of Okhotsk [Scarlato, 1981] needs special verification.

11. *Nuculana* (*Thestyleda*) *acinacea* Habe, 1958

Regional distribution: SK: Gangwon.
Zonal-biogeographical characteristics: Subtropical.

12. *Robaia robai* Kuroda, 1929

Regional distribution: SK: Gangwon; **SP**.
Zonal-biogeographical characteristics: Subtropical.
Comments: The holotype is figured in the Catalogue… [1996] and by Higo *et al.* [2001].
Biology and ecology: Scarlato [1981].

13. *Robaia habei* Scarlato, 1981

Regional distribution: SK: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: This species is recorded for Kangrung [Kangnung] in Gangwon [Choi J.-W. *et al.*, 2000].
Biology and ecology: Scarlato [1981]; Zolotarev [1989].

Family **Yoldiidae** Dall, 1908

14. *Yoldia* (*Yoldia*) *myalis* (Couthouy, 1838)

Regional distribution: SK: Gangwon.
Zonal-biogeographical characteristics: Circumboreal.
Comments: Coan *et al.* [2000] placed records of the Atlantic *Nucula limatula* auctt., non Say, 1831 in the northern Pacific in the synonymy of this species. Korean workers (e.g., Min D.-K. *et al.* [2004]) illustrate typical *Y. myalis* under the heading *Yoldia* (*Yoldia*) *limatula* (Say, 1831). Higo *et al.* [1999] erroneously listed *Y. limatula* in the Japanese fauna, including the Sea of Japan/East Sea (Oga Peninsula and northwards) but they miss *Y. myalis*, too. It is of interest that this species was not recorded in Russian waters of the Sea of Japan/East Sea.

15. *Yoldia* (*Yoldia*) *hyperborea* (A.A. Gould, 1841)

Regional distribution: SK: Gangwon: **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Comments: *Yoldia amygdalea* (Valenciennes, 1846) is a synonym of *Y. hyperborea* [Coan *et al.*, 2000]. Syntypes of *Y. amygdalea* are illustrated by Lutaenko and Héros [2011].

16. *Yoldia* (*Yoldia*) *bartschi* Scarlato, 1981

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Biology and ecology: Scarlato [1981].

17. *Yoldia* (*Cnesterium*) *notabilis* Yokoyama, 1922

Regional distribution: SK: Gyeongbuk.

Zonal-biogeographical characteristics: Subtropical-lowboreal.

Comments: Records of *Y. notabilis* for SP [Golikov and Scarlato, 1967; Kafanov, 1991; Lutaenko, 1999; 2002; 2005a] are erroneous and may refer to *Yoldia* (*Cnesterium*) *seminuda* Dall, 1871 [Lutaenko and Héros, 2011].

Biology and ecology: Lutaenko *et al.* [2003].

18. *Yoldia* (*Cnesterium*) *keppeliana* Sowerby III, 1904

Pl. 3, Figs. E–H; Text-figs. 4, 5

Regional distribution: SP; **MNP**.

Zonal-biogeographical characteristics: Lowboreal.

Comments: A syntype is figured herein (Fig. 5) for the first time.

Biology and ecology: Lutaenko [2002]; ?Tyurin and Drozdov [2005a].

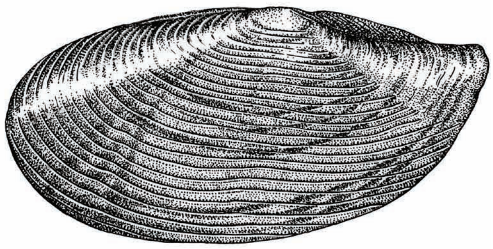

Fig. 4. *Yoldia* (*Cnesterium*) *keppeliana* Sowerby III, 1904: SP, Possjet Bay, depth 32 m, shell length 37.7 mm, ZMFU 32602/Bv-5021.

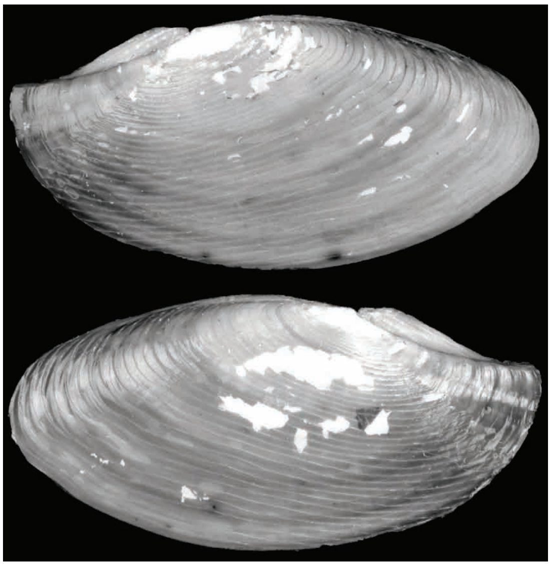

Fig. 5. *Yoldia keppeliana* Sowerby III, 1904: figured syntype, location unknown, NHM reg. no. 1904.12.23.155.

19. *Yoldia* (*Cnesterium*) *johanni* Dall, 1925

Pl. 3, Figs. A–D; Text-fig. 6

Regional distribution: SK: Gangwon; **SP**; **MNP**.

Zonal-biogeographical characteristics: Lowboreal.

Comments: Syntypes are figured by Matsukuma *et al.* [1991] and Higo *et al.* [2001].

Biology and ecology: Scarlato [1981]; Lutaenko [2002].

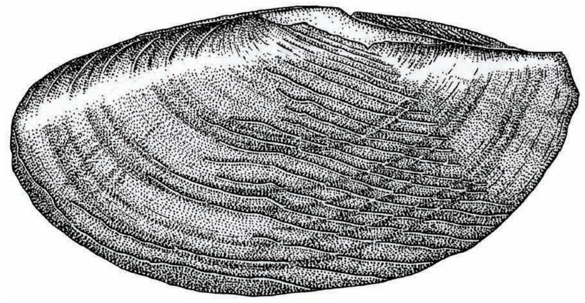

Fig. 6. *Yoldia* (*Cnesterium*) *johanni* Dall, 1925: SP, Peter the Great Bay, Cape Bryusa, depth 30 m, shell length 27.9 mm, ZMFU 32605/Bv-5024.

20. *Yoldia* (*Cnesterium*) *seminuda* Dall, 1871

Pl. 3, Figs. I, J; Text-fig. 7

Regional distribution: SP; **MNP**.

Zonal-biogeographical characteristics: Widely distributed boreal.

Biology and ecology: Scarlato [1981]; Lutaenko [2002]; ?Tyurin and Drozdov [2005a].

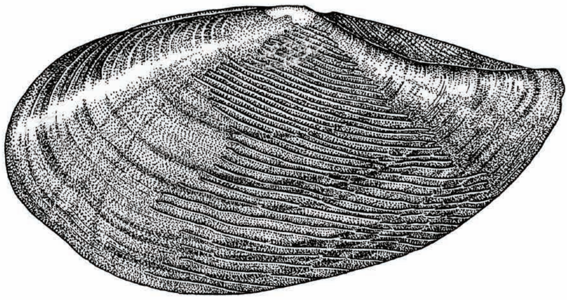

Fig. 7. *Yoldia* (*Cnesterium*) *seminuda* Dall, 1871: SP, Possjet Bay, Troitsa Bay, depth 38 m, shell length 40.6 mm, ZMFU 32603/Bv-5022.

21. *Yoldia* (*Cnesterium*) *toporoki* Scarlato, 1981

Pl. 2, Figs. G–J

Regional distribution: SP; **MNP**.

Zonal-biogeographical characteristics: Lowboreal.

Biology and ecology: Scarlato [1981].

22. *Megayoldia thraciaeformis* (Storer, 1838)

Pl. 2, Figs. A–D

Regional distribution: SK: Gangwon; **SP**; **MNP**.

Zonal-biogeographical characteristics: Circumboreal.

Biology and ecology: Scarlato [1981]; Zolotarev [1989]; Tokmakova *et al.* [2006].

23. *Portlandia lischkei* (Smith, 1885)

Regional distribution: SK: Gangwon; **SP**; **MNP**.

Zonal-biogeographical characteristics: Widely distributed boreal.

Comments: A possible syntype (NHM) is figured by Higo *et al.* [2001].

Biology and ecology: Scarlato [1981].

24. *Portlandia toyamaensis* (Kuroda, 1929)

Text-fig. 8

Regional distribution: SK: Gangwon; **SP**; **MNP**.

Zonal-biogeographical characteristics: Subtropical.

Biology and ecology: Scarlato [1981].

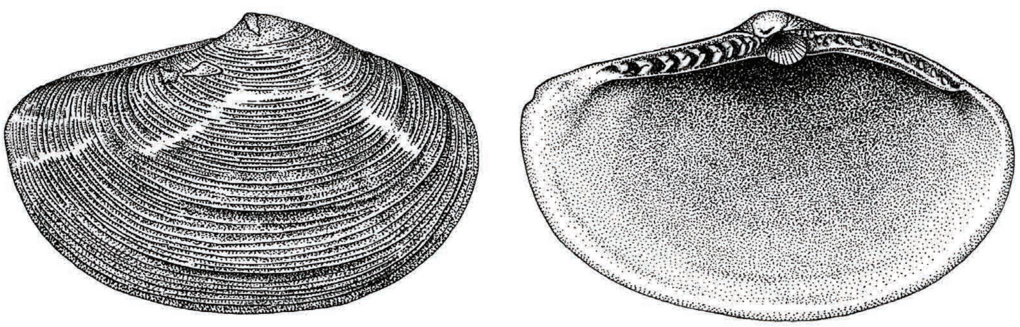

Fig. 8. *Portlandia toyamaensis* (Kuroda, 1929): SP, Peter the Great Bay, south of Furugelma Island, depth 160 m, shell length 14.8 mm, ZMFU 32604/Bv-5023.

25. *Portlandia* sp.

Regional distribution: SK: “East Sea” [Min D.-K. *et al.*, 2004].

26. *Yoldiella derjugini* Scarlato, 1981

Regional distribution: SP; **MNP**.

Zonal-biogeographical characteristics: Widely distributed boreal.

Biology and ecology: Scarlato [1981]; Lutaenko [2002]; Belan T. and Belan [2008].

27. *Yoldiella philippiana* (Nyst, 1844)

Regional distribution: SK: Gangwon.

Zonal-biogeographical characteristics: Circumboreal.

Subclass **AUTOBRANCHIA** Grobben, 1894
Superfamily **ARCOIDEA** Lamarck, 1809

Family **Arcidae** Lamarck, 1809

28. *Arca boucardi* Jousseaume, 1894
Pl. 5, Figs. E–H; Text-fig. 9

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam, Busan; **NK**: Hamnam; **SP**; **MNP**.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: This species previously found only in SP [Scarlato, 1981] later was recorded from MNP [Lutaenko, 1999; Kolpakov, 2006a]. A syntype of *A. boucardi* (MNHN) is figured by Lutaenko and Maestrati [2007].

Biology and ecology: Golikov and Scarlato [1967]; Smirnova [1973]; Zhirmunsky [1973]; Zolotarev [1976; 1980; 1989]; Evseev [1981]; Berger *et al.* [1982]; Kulikova *et al.* [1987]; Kulikova and Kolotukhina [1989]; Yavnov [2000]; Lutaenko [2002]; Kim I.-H. [2004]; Moshchenko and Belan [2005]; Tokmakova *et al.* [2006]; Drozdov *et al.* [2009].

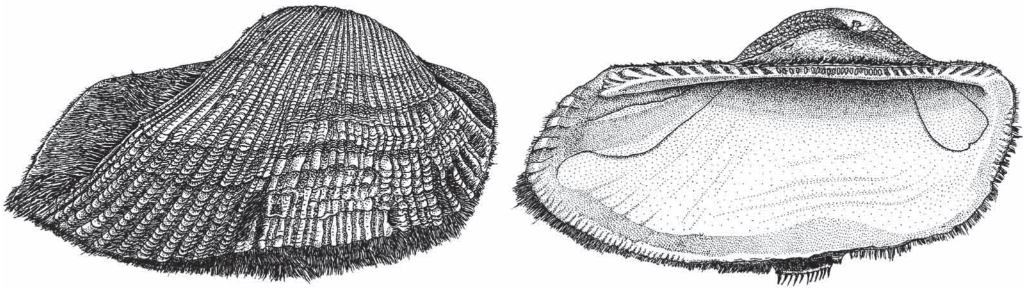

Fig. 9. *Arca boucardi* Jousseaume, 1894: SP, Possjet Bay, Troitsa Bay, shell length 47.9 mm, ZMFU 16100/Bv-2551.

29. *Arca avellana* Lamarck, 1819
Pl. 6, Figs. A, B

Regional distribution: SK: Gyeongnam; Ullung Is.
Comments: This species was found in Ullung Island [Choe B.L. *et al.*, 1994] and may be found in the future on the coast of Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.

30. *Nipponarca bistrigata* (Dunker, 1866)
Pl. 6, Figs. E, F

Regional distribution: SK: Busan.
Zonal-biogeographical characteristics: Subtropical.

31. *Barbatia* (*Savignyarca*) *virescens* (Reeve, 1844)

Regional distribution: SK: Gangwon.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: A syntype is figured by Higo *et al.* [2001].
Biology and ecology: Kim I.-H. [2004].

32. *Barbatia* (*Abarbatia*) *trapezina* (Lamarck, 1819)

Regional distribution: SK: Ulsan.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: If identification of "*Abarbatia lima*" by Yi *et al.* [1982] for Ulsan Bay is correct, this species inhabits the east coast of Korea. *Arca lima* Reeve, 1844 (=*Barbatia lima*) is a synonym of *B. trapezina* which belongs to the "*foliata*/*decussata* complex" [García and Oliver, 2008].

33. *Barbatia* (*Ustularca*) *stearnsii* (Pilsbry, 1895)

Regional distribution: SK: Ullung Is. [Choe B.L. *et al.*, 1994].
Zonal-biogeographical characteristics: Tropical-subtropical.

34. *Barbarca tenella* (Reeve, 1844)

Regional distribution: SK: Gangwon.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: This record from Aninjin (Gangwon) [Kim H.S. *et al.*, 1983] needs in verification.

35. *Anadara* (*Scapharca*) *kagoshimensis* (Tokunaga, 1906)

Pl. 5, Figs. A–D

Regional distribution: SK: Gangwon, Gyeongbuk, Busan; **NK**: Hambuk, Hamnam.
Zonal-biogeographical characteristics: Subtropical.
Comments: Bernard *et al.* [1993] discovered that the name *Anadara* (*Scapharca*) *subcrenata* (Lischke, 1869), widely used in the Asian literature, is preoccupied (non *Arca subcrenata* Michelotti, 1861). Although they proposed a new replacement name for this taxon (*Scapharca sativa* Bernard, Cai, and Morton, 1993), they also listed [l.c., p. 25] *Scapharca kagoshimensis* (Tokunaga, 1906) with a preoccupied senior synonym *Arca subcrenata* Lischke, 1869 in the synonymy. *Arca kagoshimensis* Tokunaga, 1906 is the first valid name for this species [Evseev and Lutaenko, 1998; Lutaenko, 2002]. This species existed in Peter the Great Bay in the Holocene but then became extinct in the Late Holocene [Lutaenko, 1993a; c; 2002].
Biology and ecology: Whang *et al.* [1977]; Yoo S.K. [1977]; Lee J.H. [1998]; Lee S.Y. and Kim [2003]; Kim I.-H. [2004]; Kim C.W. *et al.* [2006]; Kim S.Y. *et al.* [2008; 2009]; Jung *et al.* [2010].

36. *Anadara* (*Scapharca*) *broughtonii* (Schrenck, 1867)

Pl. 4, Figs. A–H; Text-fig. 10

Regional distribution: SK: Gyeongnam, Busan; **SP**.
Zonal-biogeographical characteristics: Subtropical.
Comments: This species existed in the Holocene on the coast of middle Primorye but then became extinct in the Late Holocene [Lutaenko, 1993a; c]. Yokogawa [1997] and Feng *et al.* [2011] found that Chinese representatives of this species are different from Japanese ones at the level of species or subspecies based on morphological and genetic analyses. Cho E.-S. *et al.* [2007] detected considerable genetic differences between the Korean, Chinese, and Russian populations of *A. broughtonii.*

Biology and ecology: Razin [1934]; Golikov and Scarlato [1967]; Yoo S.K. [1969]; Kim J.D. and Koo [1973]; Smirnova [1973]; Choe K.J. [1974]; Yoo M.-S. and Yoo S.K. [1974]; Kim W.S. and Kim [1976]; Pyen *et al.* [1976]; Zolotarev [1976; 1980; 1989]; Rho and Pyen [1977]; Yoo S.K. *et al.* [1977; 1990]; Chang Y. J. [1979]; Kim J.D. *et al.* [1979]; Kim Y. *et al.* [1981]; Berger *et al.* [1982]; Dzyuba and Maslennikova [1982]; Kwon W.-S. and Cho [1986]; Radashevsky [1989]; Motavkin *et al.* [1990]; Chun Y.-Y. *et al.* [1991]; Mun [1992]; Popov [1992]; Yoo M.-S. *et al.* [1992]; Chung E.-Y. *et al.* [1994]; Lee J.M. *et al.* [1997]; Cho B.-K. and Kim [1999]; Selin [1999c; 2000]; Kang K.-H. *et al.* [2000]; Maslennikova [2000]; Yavnov [2000]; Gabaev and Olifirenko [2001]; Lee J.S. [2002]; Lutaenko [2002]; Lee S.Y. and Kim [2003]; Afeichuk *et al.* [2004]; Kim I.-H. [2004]; Kim C.-K. *et al.* [2004]; Min K.-S. *et al.* [2004a]; Afeichuk [2005]; Cho E.-S. *et al.* [2005; 2007; 2009]; Gabaev *et al.* [2005]; Sokolenko and Sedova [2005]; Belan T. and Belan [2006]; Gabaev and Kolotukhina [2006]; Kim B.-H. *et al.* [2006; 2007; 2008]; Kim C.W. *et al.* [2006]; Shin Y.K. *et al.* [2006; 2008; 2009a; b]; Silina [2006a]; Sokolenko *et al.* [2006]; Tokmakova *et al.* [2006]; Kim J.-B. *et al.* [2007]; Olifirenko [2007a; b]; Drozdov *et al.* [2009]; Sedova *et al.* [2007; 2009]; Mok *et al.* [2010]; Rha *et al.* [2010]; Min B.H. *et al.* [2011].

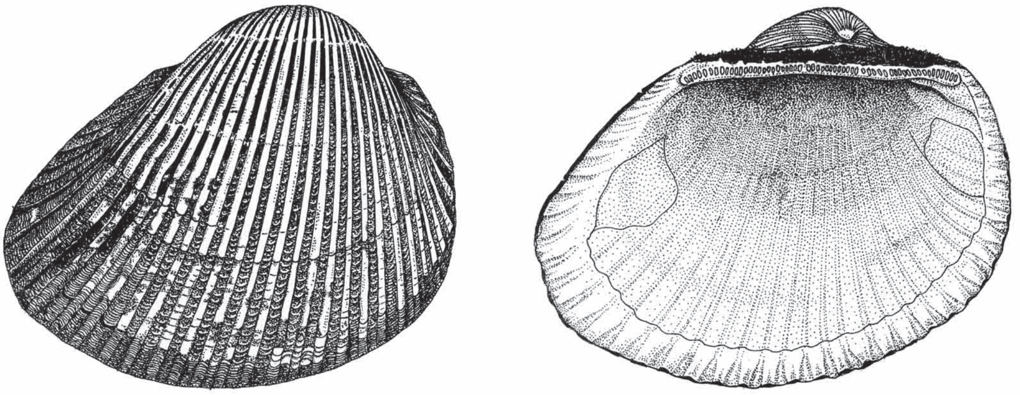

Fig. 10. *Anadara* (*Scapharca*) *broughtonii* (Schrenck, 1867): SP, Amursky Bay, depth 4 m, shell length 90.9 mm, ZMFU 12635/Bv-1636.

37. *Acar plicatum* (Dillwyn, 1817)

Regional distribution: SK: Gyeongbuk; Ullung Is.
Zonal-biogeographical characteristics: Tropical-subtropical.

Family **Noetiidae** Stewart, 1930

38. *Striarca symmetrica* (Reeve, 1844)

Pl. 6, Figs. C, D

Regional distribution: SK: Ulsan, Busan; Ullung Is.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: This species was recorded from Ulsan Bay by Yi *et al.* [1982].

39. *Estellacar olivacea* (Reeve, 1844)

Regional distribution: NK: “east coast” [West Coast Mollusks…, 1985].
Zonal-biogeographical characteristics: Tropical-subtropical.

Family **Parallelodontidae** Dall, 1898

40. *Porterius dalli* (E.A. Smith, 1885)

Pl. 6, Figs. G, H; Pl. 7, Figs. A, B

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam; Ullung Is.
Zonal-biogeographical characteristics: Subtropical.
Comments: Holotype (NHM) is figured by Higo *et al.* [2001].

Family **Glycymerididae** Dall, 1908

41. *Glycymeris* (*Glycymeris*) *yessoensis* (Sowerby III, 1889)

Pl. 7, Figs. C–F; Text-fig. 11

Regional distribution: SK: Gyeongbuk, Gangwon; **NK**: Hamnam, Gangwon; **SP**; **MNP**
Zonal-biogeographical characteristics: Lowboreal.

Biology and ecology: Golikov and Scarlato [1967]; Zolotarev [1976; 1980; 1981; 1989]; Vasilieva [1978]; Vasilieva *et al.* [1979]; Zolotarev *et al.* [1980]; Evseev [1981]; Yaroslavtseva *et al.* [1981]; Berger *et al.* [1982]; Tarasov *et al.* [1982]; Rybakov [1983a; 1986]; Drozdov and Kasyanov [1985]; Radashevsky [1989; 1993]; Paschenko and Drozdov [1991]; Popov [1992]; Selin [1999c]; Yavnov [2000]; Tokmakova *et al.* [2006].

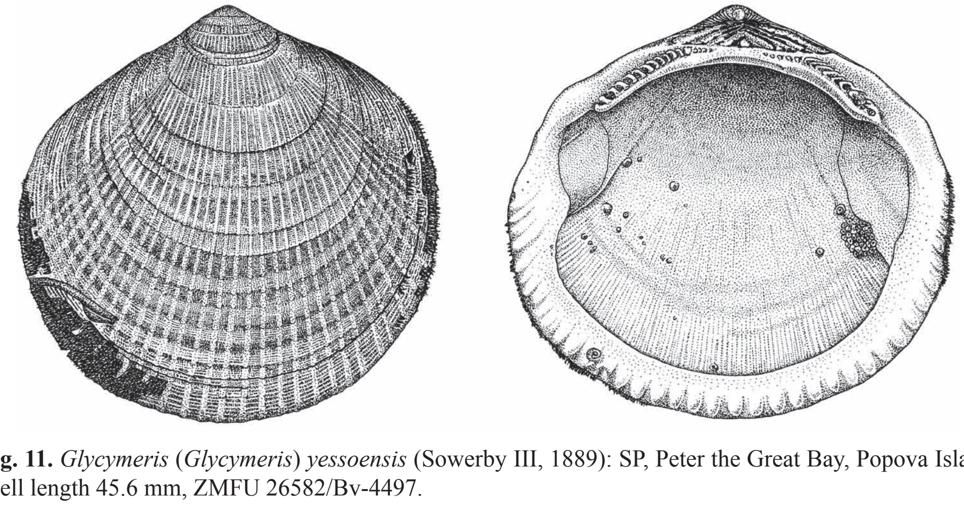

Fig. 11. *Glycymeris* (*Glycymeris*) *yessoensis* (Sowerby III, 1889): SP, Peter the Great Bay, Popova Island, shell length 45.6 mm, ZMFU 26582/Bv-4497.

42. *Glycymeris* (*Glycymeris*) *aspersa* (A. Adams et Reeve, 1850)
Pl. 8, Figs. A, B

Regional distribution: SK: Gangwon, Gyeongbuk; Ullung Is.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: The holotype (NHM) is figured by Higo *et al.* [2001].

43. *Glycymeris* (*Glycymeris*) *imperialis* Kuroda, 1934

Regional distribution: SK: Gangwon, Busan.
Zonal-biogeographical characteristics: Subtropical.
Comments: The holotype is figured by Higo *et al.* [2001].

44. *Glycymeris* (*Glycymeris*) *albolineata* (Lischke, 1872)

Regional distribution: SK: Gangwon, Gyeongnam, Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.

45. *Glycymeris* (*Glycymeris*) cf. *rotunda* (Dunker, 1882)
Pl. 8, Figs. C, D

Regional distribution: SK: Gangwon, Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.

46. *Tucetonella munda* (Sowerby III, 1903)
Pl. 8, Figs. E, F

Regional distribution: SK: Gangwon.
Zonal-biogeographical characteristics: Subtropical.
Comments: The holotype (NHM) is figured by Higo *et al.* [2001].

Superfamily **LIMOPSOIDEA** Dall, 1895

Family **Limopsidae** Dall, 1895

47. *Limopsis belcheri* (Adams et Reeve, 1850)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: *Limopsis tokaiensis* Yokoyama, 1910 listed by Kwon *et al.* [2001] is a synonym of this species. Possible type material of *L. belcheri* (NHM) is figured by Higo *et al.* [2001].

48. *Empleconia cumingii* (A. Adams, 1863)
Pl. 9, Figs. A–D

Regional distribution: SK: Gangwon, Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.
Biology and ecology: Lutaenko *et al.* [2003].

49. *Crenulilimopsis crenata* (A. Adams, 1863)

Regional distribution: SK: Gangwon.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: Possible syntypes (NHM) are figured by Higo *et al.* [2001].

Superfamily **MYTILOIDEA** Rafinesque, 1815

Family **Mytilidae** Rafinesque, 1815

50. *Mytilus* (*Mytilus*) *galloprovincialis* Lamarck, 1819

Pl. 15, Figs. E–H; Text-fig. 12

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam, Busan; Ullung Is.; **SP**; **MNP**.

Zonal-biogeographical characteristics: Circumboreal-subtropical.

Comments: *M. galloprovincialis* is a native of Europe and the Mediterranean Sea; it appeared in Japan by the end of the 1920s. Early records from China, in the 1950s, were listed as "*Mytlus edulus* L., 1758"; this species has also been recorded from Hong Kong, from around 1981, and SP, at the beginning of the 1980s [Wilkins *et al.*, 1983; Wang and Qi, 1984; Morton, 1987; Gosling, 1992; Ivanova and Lutaenko, 1998; Lee J.-S. *et al.*, 2010]. Peter the Great Bay is a hybrid zone between *M. galloprovincialis* and *Mytlus trossulus* A.A. Gould, 1850, which has been demonstrated by both morphological and genetic methods [Ivanova and Lutaenko, 1998; Skurikhina *et al.*, 2001]. Extensive hybridization of *M. galloprovincialis* with *M. trossulus* in Hokkaido was recently confirmed with the existence of two hybrid zones [Brannock *et al.*, 2009]. In Russia, this species is known in Peter the Great Bay, Moneron Island, northern Sea of Japan/East Sea, and Kunashir Island (Kurile Islands) [Ivanova, 1985; Ivanova and Lutaenko, 1998], but empty shells were recently found in MNP, at Vladimir Bay, in 2003.

Biology and ecology: Choi W.-H. [1970]; Yoo S.K. *et al.* [1970; 1988; 1990]; Bae S.W. [1979]; Shepel [1982b; 2010]; Chang D.-S. *et al.* [1987]; Kim S.Y. and Lee [1988]; Je *et al.* [1990]; McDonald *et al.* [1990]; Choi H.-G. *et al.* [1992]; Kepel and Ozolinsh [1992]; Lee J.-S. *et al.* [1992; 1997]; Lee S.H. [1994]; Lee I.S. *et al.* [1995]; Ivanova and Lutaenko [1998]; Kim Y.S. and Moon [1998]; Hur and Hur [2000]; Skurikhina *et al.* [2001]; Park H.-S. *et al.* [2004]; Szefer *et al.* [2004]; Sung *et al.* [2005]; Wi *et al.* [2005]; Kim C.W. *et al.* [2006]; Evseev and Kolotukhina [2008]; Kim Y.S. *et al.* [2008]; Semenikhina *et al.* [2008]; Gabaev [2010b]; Ju *et al.* [2010; 2011]; Mok *et al.* [2010].

51. *Mytilus* (*Mytilus*) *trossulus* A.A. Gould, 1850

Pl. 14, Figs. A–L; Text-fig. 13

Regional distribution: SP; **MNP**.

Zonal-biogeographical characteristics: Circumboreal.

Comments: There is no evidence of the existence of this species in SK [Je *et al.*, 1990; Min D.-K. *et al.*, 2004], and numerous previous records of "*M. edulis*" and associated biological and ecological data refer to *M. galloprovincialis.*

Biology and ecology: Scarlato [1960; 1981]; Golikov and Scarlato [1967]; Gorin and Murakhveri [1973]; Smirnova [1973]; Leibson and Movchan [1975]; Kozlitina [1976]; Zolotarev [1976]; Kasyanov *et al.* [1980; 1983]; Sergeeva [1980]; Gabaev [1981; 2009; 2010a; b]; Kartavtsev [1981]; Berger *et al.* [1982]; Shepel [1982b; 1986a; b; 2010]; Zvyagintsev *et al.* [1982]; Rybakov [1983a; 1986]; Buyanovsky and Kulikova [1984]; Kharazova *et al.* [1984; 1987]; Dolgov [1985]; Drozdov and Kasyanov [1985]; Malakhov and Medvedeva [1985a; 1991]; Selin [1985; 1990b]; Brykov *et al.* [1986a; b; 1996; 2004; 2000]; Drozdov and Reunov [1986a; 1997]; Kucheryavenko *et al.* [1986]; Yakovlev

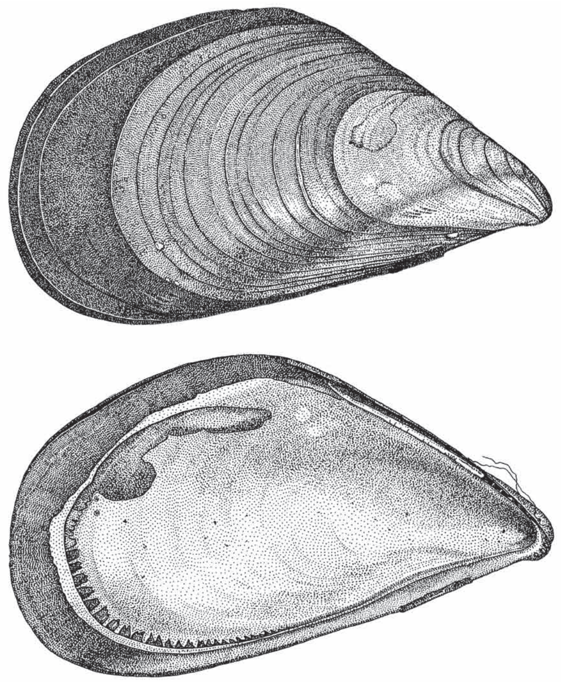

Fig. 12. *Mytilus* (*Mytilus*) *galloprovincialis* Lamarck, 1819: SP, Peter the Great Bay, Bolshoy Pelis Island, shell length 71.5 mm, ZMFU 9813/Bv-400.

[1986a; b]; Yaroslavtseva *et al.* [1986]; Zhirmunsky [1986]; Kafanov and Romeyko [1987]; Kasyanov [1987]; Kavun and Khristoforova [1987]; Khristoforova and Kavun [1987]; Kulikova and Naidenko [1987]; Sergeeva *et al.* [1987]; Kulikova and Kolotukhina [1989; 1991]; McDonald *et al.* [1990]; Grigoryeva and Regulev [1991]; Gulbin and Shadrin [1991]; Kepel and Ozolinsh [1992]; Karaseva [1993]; Karaseva and Medvedeva [1993]; Khristoforova *et al.* [1993]; Shadrin and Gulbin [1994]; Frolova and Leibson [1996]; Korn and Kulikova [1997]; Zolotarev and Shurova [1997]; Chernyaev *et al.* [1998]; Kafanov and Drozdov [1998]; Kolotukhina and Semenikhina [1998]; Afeichuk and Mokretsova [2000]; Chichvarkhin *et al.* [2000]; Nikiforov [2000]; Yavnov [2000]; Isaeva *et al.* [2001]; Skurikhina *et al.* [2001]; Evseev *et al.* [2002; 2006; 2011]; Lutaenko [2002]; Polyakova [2002]; Ponurovsky *et al.* [2002]; Nikiforov and Lykova [2003]; Yaroslavtseva and Sergeeva [2003; 2005; 2006; 2007]; Nikiforov and Budnik [2004]; Zvyagintsev [2004]; Belogurova and Maslennikov [2005]; Gabaev *et al.* [2005]; Grigoryeva *et al.* [2005]; Lyashenko [2005]; Radovets and Khristoforova [2006]; Tokmakova *et al.* [2006]; Vekhova [2006]; Evseev and Kolotukhina [2008]; Nikiforov and Zvyagintsev [2008]; Semenikhina *et al.* [2008].

52. *Mytilus* (*Mytilus*) *coruscus* Gould, 1861

Pl. 13, Figs. E–L

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam, Busan; Ullung Is.; **SP**.

Zonal-biogeographical characteristics: Subtropical.

Comments: The holotype is figured by Johnson [1964] and Lutaenko [2005d].

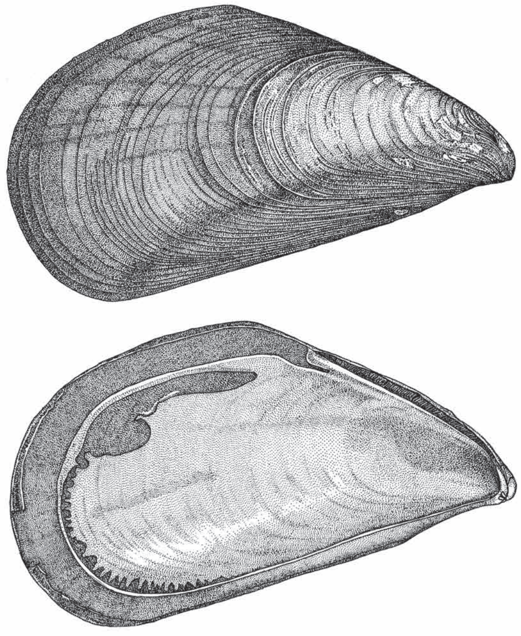

Fig. 13. *Mytilus* (*Mytilus*) *trossulus* A.A. Gould, 1850: SP, Peter the Great Bay, Furugelma Island, Zapadnaya Bay, shell length 49.6 mm, ZMFU 19057/Bv-2637.

Biology and ecology: Golikov and Scarlato [1967]; Smirnova [1973]; Zhirmunsky [1973]; Yoo S.K. and Kang Y.-J. [1974]; Zolotarev [1976; 1980; 1989]; Zolotarev and Ignatiev [1977]; Ignatiev and Romanenko [1980]; Evseev [1981]; Scarlato [1981]; Gogolev [1983]; Reunov and Drozdov [1987]; Selin [1988]; Je *et al.* [1990]; Drozdov and Reunov [1997]; Jeon and Han [1998]; Kafanov and Drozdov [1998]; Chichvarkhin *et al.* [2000]; Hur and Hur [2000]; Yavnov [2000]; Semenikhina and Kolotukhina [2001]; Evseev *et al.* [2002]; Park H.S. *et al.* [2002]; Selin and Vekhova [2002; 2004b]; Wi *et al.* [2003; 2005]; Shin Y.K. and Wi [2004]; Vekhova [2007; 2008]; Evseev and Kolotukhina [2008]; Radovets and Khristoforova [2008]; Semenikhina *et al.* [2008]; Gabaev [2010b]; Kim J.-H. *et al.* [2010a]; Mok *et al.* [2010]; Kulikova *et al.* [2011].

53. *Crenomytilus grayanus* (Dunker, 1853)

Pl. 10, Figs. A–D

Regional distribution: SK: Gangwon, Gyeongbuk; **NK**: Hamnam, Gangwon; **SP**; **MNP**.

Zonal-biogeographical characteristics: Lowboreal.

Biology and ecology: Razin [1927; 1934]; Markovskaya [1952]; Gordeeva [1957]; Scarlato [1960; 1981]; Golikov and Scarlato [1967]; Sadykhova [1968; 1969a; b; 1970; 1971]; Smirnova [1968; 1973]; Biryulina [1972]; Dzyuba [1972; 1974; 1979]; Naydin *et al.* [1973]; Zhirmunsky [1973]; Kutishchev and Drozdov [1974]; Zolotarev [1974a; b; 1976; 1980; 1989]; Leibson and Frolova [1975; 1994]; Leibson and Movchan [1975]; Kartavtsev and Nikiforov [1976]; Kasyanov *et al.* [1976; 1980; 1983]; Kozlitina [1976]; Kutishchev [1976; 1977]; Sveshnikov *et al.* [1976]; Sveshnikov [1977; 1983]; Sveshnikov and Kutishchev [1976]; Avdeev [1977]; Varaksin [1977]; Wiegman [1977;

1979a; b]; Zolotarev and Ignatiev [1977]; Motavkin *et al.* [1978; 1990]; Drozdov [1979; 1980]; Leibson and Usheva [1979]; Mileikovsky [1979]; Zolotarev and Selin [1979]; Ignatiev and Romanenko [1980]; Selin [1980; 1981; 1984; 1991; 2011]; Zolotarev *et al.* [1980]; Kharazova *et al.* [1981; 1984]; Pudovkin *et al.* [1981]; Selin and Ponurovsky [1981]; Berger *et al.* [1982]; Shepel [1982a; 2010]; Motavkin and Varaksin [1983]; Rybakov [1983a; 1986]; Drozdov and Nistratova [1984]; Dolgov [1985]; Drozdov and Kasyanov [1985]; Gabaev [1986; 2010b]; Frolova [1986; 1988a; b; 1993a; b]; Mandryka [1986]; Selin and Chernyaev [1986]; Luchsheva and Kovekovdova [1988]; Naidenko and Varaksin [1988]; Kulikova and Kolotukhina [1989]; Kalashnikova and Aizdaicher [1993]; Karaseva [1993]; Khristoforova *et al.* [1993]; Radashevsky [1993]; Shulkin and Chernova [1994]; Shulkin and Kavun [1994; 1995]; Berger and Kharazova [1997]; Drozdov and Reunov [1997]; Korn and Kulikova [1997]; Kafanov and Drozdov [1998]; Chichvarkhin *et al.* [2000]; Frolova and Leibson [2000; 2002]; Yavnov [2000]; Gavrilova [2002]; Gavrilova and Zhembrovskiy [2000]; Evseev *et al.* [2002; 2006; 2011]; Lutaenko [2002]; Selin and Vekhova [2002; 2003; 2004a; b]; Shulkin *et al.* [2002; 2003]; Kim I.-H. [2004]; Podgurskaya *et al.* [2004]; Kavun and Shulkin [2005]; Ovsyannikov and Sidyakov [2005]; Podgurskaya and Kavun [2005]; Zvereva and Vysotskaya [2005]; Sokolenko *et al.* [2006]; Tokmakova *et al.* [2006]; Usheva and Frolova [2006]; Usheva *et al.* [2006]; Vekhova [2006; 2007; 2008]; Sedova *et al.* [2007]; Evseev and Kolotukhina [2008]; Galysheva [2008]; Radovets and Khristoforova [2008]; Semenikhina *et al.* [2008]; Sidyakov [2008]; Yaroslavtseva and Sergeeva [2009a; b; 2010]; Kotsyba and Vaschenko [2010].

54. *Musculista senhousia* (Benson in Kantor, 1842)

Pl. 11, Figs. E, F

Regional distribution: SK: Gyeongnam, Busan; **SP**; **MNP**.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: A syntype is figured by Higo *et al.* [2001].

Biology and ecology: Scarlato [1960; 1981]; Golikov and Scarlato [1967]; Kasyanov *et al.* [1983]; Kulikova and Kolotukhina [1989]; Drozdov and Reunov [1997]; Kafanov and Drozdov [1998]; Lim and Park [1998]; Evseev *et al.* [2002]; Lutaenko [2002]; Moshchenko and Belan [2005]; Kim C.W. *et al.* [2006]; Evseev and Kolotukhina [2008]; Kim Y.S. *et al.* [2008]; Semenikhina *et al.* [2008]; Liang *et al.* [2009].

55. *Musculus niger* (Gray, 1824)

Pl. 13, Figs. C, D

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.

Biology and ecology: Scarlato [1960; 1981]; Lutaenko [2002].

56. *Musculus laevigatus* (Gray, 1824)

Pl. 13, Figs. A, B

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: A record of *M. laevigatus* from Ullung Island [Choe B.L. *et al.*, 1994] is erroneous and refers to another species of *Musculus.*

Biology and ecology: Scarlato [1960; 1981]; Zhirmunsky [1973]; Drozdov and Kasyanov [1985]; Drozdov and Reunov [1997]; Yavnov [2000]; Lutaenko [2002].

57. *Musculus discors* (L., 1767)

Pl. 12, Figs. A–D

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Biology and ecology: Scarlato [1960; 1981]; Lutaenko [2002].

58. *Musculus glacialis* (Leche, 1883)

Pl. 12, Fig. E

Regional distribution: SK: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Comments: The synonym of this species is *Mytilus corrugatus* Stimpson, 1851 non Brongniart, 1823, non R.A. Philippi, 1846 [Coan *et al.*, 2000].

59. *Musculus koreanus* Ockelmann, 1983

Pl. 12, Figs. F–I

Regional distribution: SK: Gangwon; **NK**; **SP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: This species was described from North Korea (37°–41° N) [Ockelmann, 1983] and then was found in SK and SP [Lutaenko, 2003b; Min D.-K. *et al.*, 2004].
Biology and ecology: Ockelmann [1983]; Lutaenko [2003b].

60. *Musculus cupreus* (Gould, 1861)

Regional distribution: SK: Gangwon; Ullung Is.
Zonal-biogeographical characteristics: Tropical-subtropical.

61. *Musculus* sp.

Regional distribution: SK: Gangwon.
Comments: Min D.-K. *et al.* [2004] listed *Musculus minutus* Scarlato, 1960 for SK. This species was described by Scarlato [1960] from northern, high-boreal regions of the north-western Pacific (Kurile Islands, Sea of Okhotsk, eastern Kamchatka, Commander Islands, and the western part of the Bering Sea), and it was never recorded from the Russian part of the Sea of Japan/East Sea. However, it is known from the Tohoku area of Japan [Kurozumi, 2000, pl. 434, fig. 56], and the specimen figured is similar to Scarlato's species. The illustration of "*M. minutus*" in Min D.K. *et al.* [2004, fig. 1216] shows that the specimen does not belong to *M. minutus* and might be provisionally identified as *Musculus* sp.

62. *Vilasina pillula* Scarlato, 1960

Pl. 11, Figs. Q, R

Regional distribution: SK: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: The holotype (NHM) is figured by Higo *et al.* [2001].
Biology and ecology: Scarlato [1960]; Golikov and Scarlato [1967]; Lutaenko [2002].

63. *Vilasina decorata* (A. Adams, 1862)

Pl. 11, Figs. O, P

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: A possible syntype (NHM) is figured by Higo *et al.* [2001].

64. *Adula falcatoides* Habe, 1955

Pl. 9, Figs. E, F

Regional distribution: SK: Gyeongbuk; **SP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: This species is not known from MNP, but Scarlato [1981] recorded this from western Sakhalin.

Biology and ecology: Scarlato [1981]; Kasyanov *et al.* [1983]; Reunov and Drozdov [1986]; Kulikova and Kolotukhina [1989]; Drozdov and Reunov [1997]; Kafanov and Drozdov [1998]; Chichvarkhin *et al.* [2000]; Evseev *et al.* [2002]; Evseev [2005]; Evseev and Kolotukhina [2008]; Semenikhina *et al.* [2008].

65. *Adula schmidtii* (Schrenck, 1867)

Regional distribution: SK: Gangwon; Gyeongbuk; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: Min D.-K. *et al.* [2004, fig. 1229; as "*cariforniensis*"] illustrated *Adula californiensis* (Philippi, 1847) from Gyeongbuk. This species does not occur in the north-western Pacific, and material from the Sea of Okhotsk and Japan should instead be referred to *Adula schmidtii* (Schrenck, 1867) [Coan *et al*., 2000]. The figure from Min D.-K. *et al.* [l.c.] is similar indeed to the latter species, which has been found only in Sovetskaya Gavan Bay in MNP [Scarlato, 1981].

Biology and ecology: Ockelmann and Dinesen [2009].

66. *Septifer* (*Septifer*) *bilocularis* (Linnaeus, 1758)

Regional distribution: SK: Gyeongbuk [Dokdo]; Ullung Is.
Zonal-biogeographical characteristics: Tropical-subtropical.

67. *Septifer* (*Septifer*) *excisus* (Wiegmann, 1837)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.

68. *Septifer* (*Mytilisepta*) *virgatus* (Wiegmann, 1837)

Pl. 11, Figs. K–N

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam, Busan.
Zonal-biogeographical characteristics: Tropical-subtropical.

69. *Septifer* (*Mytilisepta*) *keenae* Nomura, 1936

Pl. 11, Figs. G–J

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam, Busan; **SP**.
Zonal-biogeographical characteristics: Subtropical.

Biology and ecology: Scarlato [1960; 1981]; Golikov and Scarlato [1967]; Zolotarev [1976; 1980; 1989]; Evseev [1981]; Berger *et al.* [1982]; Reunov and Drozdov [1986]; Drozdov and Reunov [1997]; Kafanov and Drozdov [1998]; Selin [1999]; Chichvarkhin *et al.* [2000]; Yavnov [2000]; Evseev *et al.* [2002; 2004b]; Evseev and Kolotukhina [2008]; Semenikhina *et al.* [2008]; Gabaev [2010b].

70. *Modiolus* (*Modiolus*) *kurilensis* Bernard, 1983

Pl. 10, Figs. G–J

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam, Busan; Ullung Is.; **SP**; **MNP**.
Zonal-biogeographical characteristics: Subtropical-boreal.

Biology and ecology: Scarlato [1960; 1981]; Mikulich and Rodin [1963]; Golikov and Scarlato [1967]; Smirnova [1973]; Zhirmunsky [1973]; Kasyanov *et al.* [1980]; Zolotarev [1976; 1980; 1989]; Avdeev [1977]; Evseev [1981]; Kartavtsev [1981]; Selin and Ponurovsky [1981]; Berger *et al.* [1982]; Rybakov [1983a; 1986]; Drozdov and Kasyanov [1985]; Drozdov and Reunov [1986b; 1997]; Kulikova and Kolotukhina [1989]; Gogolev [1990]; Selin *et al.* [1991]; Khristoforova *et al.* [1993]; Radashevsky [1993]; Shulkin and Kavun [1994; 1995]; Usheva and Odintsova [1997]; Kafanov and Drozdov [1998]; Kolotukhina and Semenikhina [1998]; Chichvarkhin *et al.* [2000]; Yavnov [2000]; Evseev *et al.* [2002]; Lutaenko [2002]; Shulkin *et al.* [2002]; Selin and Vekhova [2004a; b]; Dovzhenko *et al.* [2005]; Podgurskaya and Kavun [2005]; Tokmakova *et al.* [2006]; Vekhova [2006; 2007; 2008]; Evseev and Kolotukhina [2008]; Radovets and Khristoforova [2008]; Semenikhina *et al.* [2008]; Yurchenko and Vaschenko [2008; 2010]; Gabaev [2010b]; Selin [2011].

71. *Modiolus* (*Modiolus*) *auriculatus* (Krauss, 1848)

Pl. 10, Figs. E, F; Pl. 11, Figs. A, B

Regional distribution: SK: Gangwon, Gyeongbuk, Busan; Ullung Is.
Zonal-biogeographical characteristics: Tropical-subtropical.

72. *Modiolus* (*Modiolus*) *metcalfei* (Hanley, 1843)

Regional distribution: SK: Gyeongbuk, Busan.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: The lectotype (NHM) is figured by Higo *et al.* [2001].

73. *Modiolus* (*Modiolus*) *agripetus* (Iredale, 1939)

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam, Busan.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: This species is listed for Busan as *Modiolus nipponicus* (Oyama, 1950) [Son and Hong, 2005].

74. *Modiolus* (*Modiolus*) *comptus* Sowerby III, 1915

Regional distribution: SK: Gangwon, Busan; Ullung Is.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: The holotype (NHM) is figured by Higo *et al.* [2001].

75. *Modiolus* (*Modiolus*) *margaritaceus* (Nomura et Hatai, 1940)

Regional distribution: SK: Gangwon, Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

76. *Modiolus* (*Fulgida*) *oyamai* Habe in Kuroda et Habe, 1981

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

77. *Modiolus* (*Modiolusia*) *elongata* Swainson, 1821

Regional distribution: SK: Gangwon; Busan.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: This species is listed for Busan and Aninjin (Gangwon) as *Modiolus nitidus* (Reeve, 1857) [Kim H.S. *et al.*, 1983; Son and Hong, 2005].

78. *Xenostrobus securis* (Lamarck, 1819)

Regional distribution: SK: Gangwon.
Zonal-biogeographical characteristics: Subtropical.
Comments: This species was illustrated as *X. securis* by Kwon *et al.* [2001] with a synonym *Limnoperna fortunei kikuchii* Habe, 1981, in accordance with a study of Kimura *et al.* [1999]. However, later Min D.-K. *et al.* [2004] illustrated the same specimen as "*Limnoperna fortunei kikuchii*".

79. *Arvella japonica* (Dall, 1897)

Pl. 9, Figs. G–J

Regional distribution: MNP.
Zonal-biogeographical characteristics: Lowboreal.
Comments: The holotype is figured by Higo *et al.* [2001].

80. *Crenella decussata* (Montagu, 1808)

Regional distribution: MNP.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Comments: A synonym of this species is *Crenella decussata laticostata* Scarlato, 1960 [Coan *et al.*, 2000].

Biology and ecology: Scarlato [1960; 1981]; Evseev [1981]; Evseev *et al.* [2002; 2007]; Evseev and Kolotukhina [2008]; Semenikhina *et al.* [2008]; Kolotukhina *et al.* [2011].

81. *Gregariella coralliophaga* (Gmelin, 1791)

Regional distribution: SK: Ulsan; Ullung Is.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: This species was recorded for the Ulsan area [Rho *et al.*, 1997] and Ullung Is. [Choe B.L. *et al.*, 1994].

82. *Solamen columbianum* (Dall, 1897)

Regional distribution: SK: "east coast" [Min D.-K. *et al.*, 2004]; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: A synonym of this species is *Crenella tamurai* Habe, 1955.
Biology and ecology: Scarlato [1960; 1981].

83. *Solamen leanum* (Dall, 1897)

Regional distribution: SP.
Zonal-biogeographical characteristics: Widely distributed boreal.
Biology and ecology: Scarlato [1981].

84. *Dacrydium* (*Dacrydium*) *vitreum* (Möller, 1842)

Regional distribution: SK: Gangwon; **SP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Biology and ecology: Scarlato [1960; 1981].

85. *Lithophaga* (*Leiosolenus*) *curta* (Lischke, 1874)
Pl. 11, Figs. C, D

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam, Busan; Ullung Is.
Zonal-biogeographical characteristics: Tropical-subtropical.

Superfamily **PTERIOIDEA** Gray, 1847

Family **Pteriidae** Gray, 1847

86. *Pteria brevialata* (Dunker, 1872)

Regional distribution: SK: Busan.
Zonal-biogeographical characteristics: Tropical-subtropical.

87. *Pinctada albina* (Lamarck, 1819)

Regional distribution: SK: "south-eastern coast" [Kwon *et al.*, 1993].
Zonal-biogeographical characteristics: Tropical-subtropical.

88. *Pinctada fucata* (Gould, 1850)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.
Biology and ecology: Yoo S.K. *et al.* [1986]; Cho C.-H. *et al.* [1988]; Chang Y.J. *et al.* [2000].

89. *Pinctada radiata* (Leach, 1814)

Regional distribution: SK: Gyeongnam, Busan.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: According to Higo *et al.* [1999], *Pinctada martensii* Dunker, 1880, cited by Korean workers [Lee J.-S. and Min, 2002; Min D.-K. *et al.*, 2004], is a synonym of this species. Tëmkin *et al.* [2009] showed that Dunker originally described and illustrated this species as "*Avicula* (*Meleagrina*) *japonica*," the name he had established earlier for a different species, *Avicula japonica* Dunker, 1852. Subsequently Dunker expressly admitted the error and proposed a replacement name "*martensii*" for the junior primary homonym.

Biology and ecology: Lee T.Y. [1972]; Choi Y.H. and Chang [2003].

Superfamily **PINNOIDEA** Leach, 1819

Family **Pinnidae** Leach, 1819

90. *Atrina* (*Servatrina*) *pectinata* (L., 1767)

Regional distribution: SK: Gyeongnam, Busan.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: Yokogawa [1996] suggested that genetically detected differences of *A. pectinata* in a sympatric population in Japan are considerable and can be regarded as a distinct species.

Biology and ecology: Yoo S.K. and Yoo [1984]; Yoo S.K. *et al.* [1988]; Kim C.W. and Hur [1998]; Yang *et al.* [1998]; Son P.-W. *et al.* [2005]; Kim C.W. *et al.* [2007]; Kim D.H. *et al.* [2008]; Mok *et al.* [2010].

Superfamily **OSTREOIDEA** Rafinesque, 1815

Family **Ostreidae** Rafinesque, 1815

91. *Ostrea denselamellosa* Lischke, 1869
Pl. 17, Figs. C, D

Regional distribution: SK: Gyeongbuk, "southern part of east coast" [Gyeongnam] [Park B.H. *et al.*, 1989], Busan.
Zonal-biogeographical characteristics: Subtropical.
Comments: A possible syntype is figured by Higo *et al.* [2001].

Biology and ecology: Lee S.Y. *et al.* [2000]; Yang *et al.* [2001; 2003]; Kim C.W. *et al.* [2006]; Mok *et al.* [2010].

92. *Ostrea futamiensis* Seki, 1929

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.
Comments: This species, found in Namhae Island in Gyeongnam [Qi and Choe, 2000], is included as it can be found in the future in other parts of the province.

93. *Crassostrea gigas* (Thunberg, 1793)
Pl. 16, Figs. A–F

Regional distribution: SK: Gyeongbuk, Busan; "all parts of Korea" [Min D.-K. *et al.*, 2004]; **NK**: Hamnam, Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: Kolpakov [2006b] clearly showed that this species inhabits the entire continental coast of the Sea of Japan/East Sea northward to De Kastri (Chikhacheva) Bay, Tatarsky Strait, being found in several bays along the coast of Primorye (Olga, Dzhigit, Skovorodka).

Biology and ecology: Razin [1927; 1931; 1934]; Vialov [1945]; Scarlato [1960; 1981]; Bae K.M. [1967]; Golikov and Scarlato [1967]; Chun S.K. [1970; 1972; 1979]; Chung and Kwak [1970]; Bae G.M. and Bae [1971; 1972a; b]; Bae G.M. [1972; 1973]; Smirnova [1973]; Yoo S.K. and Yoo M.S. [1973]; Zhirmunsky [1973]; Rakov [1974; 1975b; c; 1979a; b; 1982; 2008]; Leibson and Movchan [1975]; Bae P.-A. *et al.* [1976a; b; 1978]; Kasyanov *et al.* [1976; 1980; 1983]; Yu and Bae [1977]; Bae P.A. and Kim [1978]; Kang P.A. *et al.* [1978; 1980]; Yakovlev [1978]; Nikiforov [1979a; b]; Cho C.H. [1980; 1996]; Kim Y.H. [1980]; Kim Y. *et al.* [1980; 1982]; Paik [1980]; Yoo S.K. *et al.* [1980; 1990]; Evseev [1981]; Pudovkin *et al.* [1981]; Yakovlev *et al.* [1981]; Yoo S.K. and Park K.Y. [1981]; Berger *et al.* [1982]; Zvyagintsev *et al.* [1982; 2004]; Kharasova *et al.* [1984]; Bae S.-W. [1985]; Dolgov [1985]; Drozdov and Kasyanov [1985]; Kwon and Won [1985]; Malakhov and Medvedeva [1985b; 1991]; Yoo S.K. and Ryu [1985]; Rakov and Zolotova [1986]; Rybakov [1986]; Grigoryeva and Zolotova [1987; 1988]; Kim S.Y. and Lee [1988]; Sirenko *et al.* [1988]; Khristoforova and Chernova [1989]; Kulikova and Kolotukhina [1989; 1991]; Yaroslavtseva *et al.* [1990]; Lee B.-D. *et al.* [1991]; Zvyagintsev [1991]; Choi H.-G. *et al.* [1992]; Karaseva [1993]; Khristoforova *et al.* [1993]; Radashevsky [1993]; Lee S.H. [1994]; Kim Y.-S. [1995]; An and Lee [1996]; Evseev *et al.* [1996]; Berger and Kharazova [1997]; Choi W.-J. *et al.* [1997]; Kim S.H. *et al.* [1997]; Korn and Kulikova [1997]; Lee C.-S. and Park [1997]; Bae P.-A. and Han [1998]; Choi J.-D. and Jeong [1998]; Choi J.-D. *et al.* [1998]; Choi S.D. and Kim [1999]; Jeong *et al.* [1999; 2001; 2005]; Chang Y.J. *et al.* [2000]; Hur and Hur [2000]; Lee S.Y. *et al.* [2000]; Yavnov [2000]; Hyun *et al.* [2001]; Hur *et al.* [2002; 2008]; Ngo *et al.* [2002; 2003; 2006]; Oh *et al.* [2002]; Park Y.C. and Choi [2002]; Polyakova [2002]; Choi Y.H. *et al.* [2003]; Kim J.H. *et al.* [2003]; Shulkin *et al.* [2003]; Choi D.L. *et al.* [2004]; Kim I.-H. [2004]; Min K.-S. *et al.* [2004b]; Gabaev *et al.* [2005]; Grigoryeva *et al.* [2005]; Kim C.W. *et al.* [2006]; Radovets and Khristoforova [2006]; Sokolenko *et al.* [2006]; Tokmakova *et al.* [2006]; Cho E.-S. and Jeong [2008]; Okimoto *et al.* [2008]; Cho S.-M. *et al.* [2009]; Drozdov *et al.* [2009]; Kim W.-J. *et al.* [2009]; Bang *et al.* [2010]; Kang D.-H. *et al.* [2010]; Lee J.S., Lee Y.G. *et al.* [2010]; Mok *et al.* [2010]; Yurchenko *et al.* [2010].

94. *Crassostrea nippona* (Seki, 1934)
Pl. 16, Figs. G, H

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam, Busan; Ullung Is. **Zonal-biogeographical characteristics:** Subtropical.
Comments: This species has been sometimes misspelled in literature as "*nipponica*". The close relationship of *C. nippona* and *Crassostrea hongkongensis* Lam and Morton, 2003 has been demonstrated based on mitochondrial genome comparison [Yu and Li, 2011].

Biology and ecology: Yoo S.K. and Kang [1996]; Yoo S.K. and Park [1997]; Lee S.Y. *et al.* [2000]; Kim W.-J. *et al.* [2009]; Kim J.H *et al.* [2010b].

95. *Crassostrea ariakensis* (Fujita in Wakiya, 1929)

Regional distribution: SK: Gyeongnam; **NK** [West Coast Mollusks…, 1985].
Zonal-biogeographical characteristics: Subtropical.
Comments: This species is known from central Honshu, Osaka Bay, and Seto Inland Sea in Japan, the Yellow Sea, and central and southern China [Higo *et al.*, 1999; Xiao *et al.*, 2010], and South Korea [Lee J.-S. and Min, 2002; Yoon H.S. *et al.*, 2008]. *C. ariakensis*, *C. hongkongensis*, and *C. nippona* are closely related species based on molecular data [Reece *et al.*, 2008].
Biology and ecology: Lee S.Y. *et al.* [2000]; Kim W.-J. *et al.* [2009]; Xiao *et al.* [2010].

96. *Crassostrea echinata* (Quoy et Gaimard, 1835)

Regional distribution: SK: Gyeongnam, Busan; Ullung Is.
Zonal-biogeographical characteristics: Tropical-subtropical.

97. *Saccostrea kegaki* Torigoe et Inaba, 1981

Regional distribution: SK: Gyeongbuk [Dokdo].
Zonal-biogeographical characteristics: Subtropical.

98. *Striostrea circumpicta* (Pilsbry, 1904)

Regional distribution: SK: Gangwon, Gyeongbuk [Dokdo], Gyeongnam, Ulsan, Busan.
Zonal-biogeographical characteristics: Subtropical.
Comments: A syntype is figured by Higo *et al.* [2001].

Family **Gryphaeidae** Vialov, 1936

99. *Parahyotissa inermis* (Sowerby II, 1871)

Regional distribution: SK: Gyeongbuk, Busan.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: The holotype (NHM) is figured by Higo *et al.* [2001].

100. *Parahyotissa* cf. *inaequivalvis* (Sowerby II, 1871)

Pl. 17, Figs. E, F

Regional distribution: SK: Busan; Ullung Is.
Zonal-biogeographical characteristics: Tropical-subtropical.

Superfamily **ANOMIOIDEA** Rafinesque, 1815

Family **Anomiidae** Rafinesque, 1815

101. *Pododesmus* (*Monia*) *macrochisma* (Deshayes, 1839)

Pl. 23, Figs. C–F

Regional distribution: SK: Gangwon, Gyeongnam, Busan; Ullung Is.; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.

Comments: Although Scarlato [1981] believed that this species inhabits the Sea of Japan/East Sea south to Cape Povorotny, it was found later in Peter the Great Bay, western area [Moskaletz, 1984], Ussuriysky Bay [Lutaenko, 2005a] and Possjet Bay, east of Furugelm Island [Lutaenko, unpublished data].

Biology and ecology: Scarlato [1960; 1981]; Zolotarev [1976]; Evseev [1981]; Radashevsky [1993]; Yavnov [2000]; Drozdov *et al.* [2009].

102. *Pododesmus* (*Monia*) *umbonata* (Gould, 1861)

Regional distribution: SK: "east coast" [Kwon *et al.*, 1993].
Zonal-biogeographical characteristics: Subtropical.

103. *Anomia chinensis* Philippi, 1849

Pl. 23, Figs. G–H

Regional distribution: SK: Gangwon, Gyeongbuk [Dokdo]; Ullung Is.; **NK**: Hamnam, Gangwon.
Zonal-biogeographical characteristics: Tropical-subtropical.

Superfamily **DIMYOIDEA** P. Fischer, 1886

Family **Dimyidae** P. Fischer, 1886

104. *Dimya japonica* Habe, 1971

Pl. 23, Figs. I–J

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

Superfamily **PECTINOIDEA** Wilkes, 1810

Family **Pectinidae** Wilkes, 1810

105. *Chlamys* (*Chlamys*) *chosenica* Kuroda, 1932

Pl. 20, Figs. A–D; Text-fig. 14

Regional distribution: SK: Gangwon; **NK**; **SP**; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: Kafanov and Lutaenko [1998a] synonymized *Chlamys rosealba* Scarlato, 1981, described from Olga Bay, middle Primorye, with this species described from northern Korea. They did not examine the holotype of *C. chosenica* and compared only illustrations in the original description with *Ch. rosealba*. However, examination of collections taken later in Peter the Great Bay and in middle Primorye showed that there are two forms of *Chlamys* in the region similar to two above-mentioned species and they might be treated as distinct species. The problem requires more detailed study and will be discussed elsewhere. The holotype of *Ch. chosenica* is figured by Higo *et al.* [2001].

"*Chlamys* (*Chlamys*) *islandicus hindsii* (Carpenter, 1864)" and "*Chlamys* (*Chlamys*) *islandicus islandicus* (Müller, 1776)" figured by Min D.-K. *et al.* [2004]

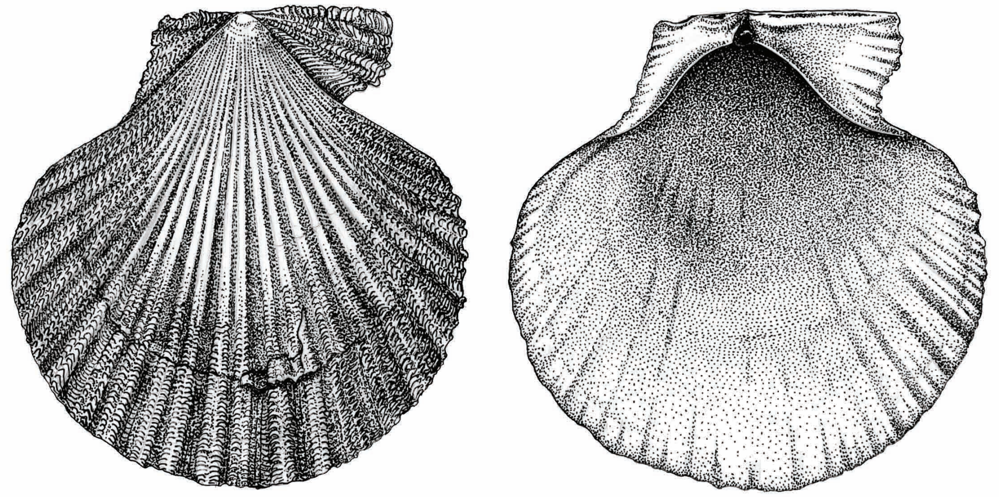

Fig. 14. *Chlamys* (*Chlamys*) cf. *chosenica* Kuroda, 1932: SP, Possjet Bay, depth 107 m, shell height 57.5 mm, ZMFU 32442/Bv-5018.

from Gangwon may belong to *C. rosealba*. *Pecten hindsii* Carpenter, 1864 is a synonym of *Chlamys rubida* (Hinds, 1845) [Coan *et al.*, 2000]. Scarlato [1981] described a subspecies, *Chlamys hindsi asiaticus* Scarlato, 1981, which is a synonym of *Ch. rubida*, according to Coan *et al.* [2000]. Although many authors believed that *Chlamys islandica* (Müller, 1776) inhabits the northern Pacific, this circumpolar species does not live in the Pacific Ocean, and is not present in the Chukchi and Beaufort seas and in the entrance to the Bering Strait [Dijkstra *et al.*, 2009].

Biology and ecology: Scarlato [1981]; Myasnikov [1982]; Khristoforova *et al.* [1989]; Silina and Pozdnyakova [1990]; Myasnikov *et al.* [1992]; Yavnov [2000]; Tyurin and Drozdov [2003]; Ivin and Kalashnikov [2005; 2007]; Ivin *et al.* [2006].

106. *Chlamys* (*Chlamys*) *albida* (R. Arnold, 1906)

Text-fig. 15

Regional distribution: MNP.

Zonal-biogeographical characteristics: Boreal-arctic.

Comments: This species was recorded only in Tatarsky Strait [Scarlato, 1981] and in middle Primorye [Lutaenko, 1999]. Specimens of "*Chlamys* (*Chlamys*) *islandicus erythrocomatus* (Dall, 1907)" illustrated by Min D.-K. *et al.* [2004; fig. 1302] from Gangwon may belong to this species.

107. *Chlamys* (*Chlamys*) *behringiana* (Middendorff, 1849)

Pl. 19, Figs. E–H

Regional distribution: SP, **MNP**.

Zonal-biogeographical characteristics: Widely distributed boreal.

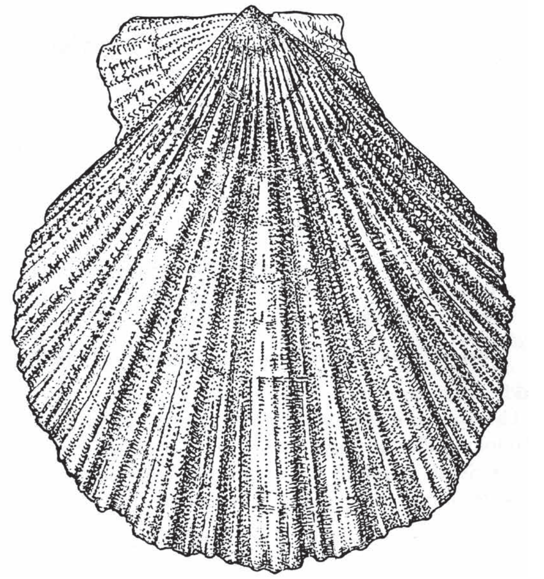

Fig. 15. *Chlamys* (*Chlamys*) *albida* (R. Arnold, 1906): MNP, near Udobnaya Bay, depth 111 m, shell height 38 mm, MIMB (after Lutaenko [1999]).

Comments: We recorded this species in MNP [Lutaenko, 1999] with some doubts. *Chlamys behringiana scarlatovi* Myasnikov, Zgurovsky and Temnych, 1992 [Myasnikov *et al.*, 1992] was described from MNP but without designation of the holotype and a photograph, only with a basic drawing, and the location of syntypes is unknown. The finding of subfossil shells of *C. behringiana* in Peter the Great Bay at a depth of 70–72 m [Lutaenko, 2002] may be related to the early Holocene deposits, and the species may not exist at present in the southernmost part of its distributional range.

108. *Chlamys* (*Azumapecten*) *farreri* (Jones et Preston, 1904)

Pl. 19, Figs. A–D

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam, Busan; Ullung Is.; **SP**.
Zonal-biogeographical characteristics: Subtropical.
Comments: *Chlamys farreri nipponensis* Kuroda, 1932 is a synonym of this species [Wang, 1983; 2002; Kafanov and Lutaenko, 1998a]. A syntype of *Ch. farreri* (NHM) is figured by Higo *et al.* [2001].

Biology and ecology: Scarlato [1960; 1981]; Golikov and Scarlato [1967]; Whang and Kim [1973]; Zhirmunsky [1973]; Krasnov and Pozdnyakova [1975; 1982]; Ignatiev *et al.* [1976]; Dzyuba [1979]; Pozdnyakova [1980]; Gabaev [1981; 2009; 2010a; b]; Kulikova *et al.* [1981]; Kasyanov *et al.* [1983]; Kalashnikova [1984]; Chan [1986]; Rybakov [1986]; Kulikova and Kolotukhina [1989]; Na *et al.* [1995]; Korn and Kulikova [1997]; Kim J.-J. and Park [1999]; Kang and Zhang [2000]; Yavnov [2000]; Chee *et al.* [2001]; Kim M.-J. *et al.* [2001]; Tyurin and Drozdov [2003]; Chung E.-Y. *et al.* [2005]; Gabaev *et al.* [2005]; Ivin and Kalashnikov [2005; 2007]; Ivin *et al.* [2006]; Mok *et al.* [2010].

109. *Chlamys* (*Azumapecten*) *squamata* (Gmelin, 1791)

Pl. 17, Figs. G, H

Regional distribution: SK: Gyeongnam, Busan.
Zonal-biogeographical characteristics: Tropical-subtropical.

110. *Chlamys* (*Azumapecten*) *lemniscata* (Reeve, 1853)

Pl. 21, Figs. A, B

Regional distribution: SK: Gangwon, Gyeongnam; Ullung Is.
Zonal-biogeographical characteristics: Tropical-subtropical.

111. *Chlamys* (*Swiftopecten*) *swiftii* (Bernardi, 1858)

Pl. 18, Figs. E–H

Regional distribution: SK: Gangwon, Gyeongbuk; **SP**; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.

Biology and ecology: Scarlato [1960; 1981]; Golikov and Scarlato [1967]; Smirnova [1973]; Zhirmunsky [1973]; Zolotarev *et al.* [1974]; Avdeev [1975]; Krasnov and Pozdnyakova [1975; 1982]; Rakov [1975a]; Ignatiev *et al.* [1976]; Kukin [1976]; Zolotarev [1976; 1980; 1989]; Kafanov [1979]; Kasyanov *et al.* [1980; 1983]; Pozdnyakova [1980]; Evseev [1981]; Gabaev [1981; 2009; 2010a; b]; Kulikova *et al.* [1981]; Berger *et al.* [1982]; Silina and Pozdnyakova [1982]; Dautov and Karpenko [1983]; Ponurovsky and Silina [1983]; Drozdov and Kasyanov [1985]; Rybakov [1986]; Kulikova and Kolotukhina [1989]; Radashevsky [1993]; Korn and Kulikova [1997]; Kim J.-J. and Park [1999]; Yavnov [2000]; Kim M.-J. *et al.* [2001]; Silina [2003c]; Tyurin and Drozdov [2003]; Ivin and Kalashnikov [2005; 2007]; Kolpakov [2005]; Ivin *et al.* [2006]; Radovets and Khristoforova [2008].

112. *Chlamys* (*Scaeochlamys*) *irregularis* (Sowerby II, 1842)

Pl. 20, Figs. E, F

Regional distribution: SK: Gangwon; Ullung Is.
Zonal-biogeographical characteristics: Tropical-subtropical.

113. *Chlamys* (*Coralichlamys*) *empressae* Kuroda et Habe in Kuroda, Habe et Oyama, 1971

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: The holotype is figured by Higo *et al.* [2001].

114. *Chlamys* (*Coralichlamys*) *jousseaumei* (Bavay, 1904)

Regional distribution: SK: Ullung Is. [Choe B.L. *et al.*, 1994].
Zonal-biogeographical characteristics: Tropical-subtropical.

115. *Bractechlamys quadrilirata* (Lischke, 1870)

Regional distribution: SK: Gangwon.
Zonal-biogeographical characteristics: Tropical-subtropical.

116. *Pecten* (*Oppenheimopecten*) *sinensis puncticulatus* Dunker, 1877

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.
Comments: Djikstra [1991] and [Rombouts, 1991] regard this species as a synonym of *Pecten excavatus* Anton, 1839.

117. *Pecten* (*Notovola*) *albicans* (Schröter, 1802)

Pl. 21, Figs. C, D

Regional distribution: SK: Gyeongbuk, Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

118. *Mizuhopecten yessoensis* (Jay, 1857)

Pl. 18, Figs. A–D

Regional distribution: SK: Gangwon, Gyeongbuk; **NK**: Hamnam; **SP**; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.

Biology and ecology: Bazikalova [1930; 1950]; Razin [1931; 1934]; Markovskaya [1951]; Scarlato [1960; 1981]; Golikov and Scarlato [1967]; Yoo S.K. and Imai [1968]; Biryulina and Rodionov [1972]; Belogrudov [1973a; b; c]; Smirnova [1973]; Zhirmunsky [1973]; Avdeev [1975]; Belogrudov and Maltsev [1975]; Krasnov and Pozdnyakova [1975; 1982]; Leibson and Movchan [1975]; Maltsev [1975]; Tibilova and Bregman [1975]; Dzyuba and Gruzova [1976]; Ignatiev *et al.* [1976]; Kasyanov *et al.* [1976; 1980; 1083]; Naidenko [1976]; Naidenko and Selin [1976]; Silina [1976; 1978; 1983; 1990; 1994a; b; 1995; 1996; 2001; 2003a; b; 2004; 2006b; 2007; 2008]; Silina *et al.* [1976; 2001]; Zolotarev [1976; 1980; 1989]; Bregman *et al.* [1977]; Lee B.H. and Chang [1977]; Varaksin [1977]; Zhirmunsky *et al.* [1977]; Pyen and Rho [1978]; Bregman [1979]; Dzyuba [1979]; Leibson and Usheva [1979]; Mandryka [1979; 1986]; Motavkin and Varaksin [1979; 1983]; Usheva [1979; 1983; 1998; 1999; 2001]; Yoo S.K. and Park [1979]; Zhakin [1979]; Gabaev and Kalashnikova [1980]; Lee B.H. and Jo [1980]; Pozdnyakova [1980]; Evseev [1981]; Gabaev [1981; 1986; 2008a; b; 2009; 2010a; b]; Kulikova *et al.* [1981]; Mikulich and Tsikhon-Lukanina [1981]; Yoo S.K. *et al.* [1981]; Berger *et al.* [1982]; Kang H.W. *et al.* [1982]; Logvinenko *et al.* [1982]; Nikiforov and Dolganov [1982]; Silina and Pozdnyakova [1982]; Volkov *et al.* [1982]; Dautov and Karpenko [1983]; Kalashnikov [1983; 1984; 1985; 1991a; b]; Konovalova and Polikarpova [1983]; Kharazova *et al.* [1984]; Varaksin and Deridovich [1984]; Drozdov and Kasyanov [1985]; Evdokimov [1986]; Guida *et al.* [1986]; Kucheryavenko *et al.* [1986]; Makarova [1986]; Malakhov and Medvedeva [1986; 1991]; Motavkin [1986]; Rybakov [1986]; Viktorovskaya [1986]; Chan [1988]; Evtushenko *et al.* [1988]; Sirenko *et al.* [1988]; Usheva and Leibson [1988]; Yaroslavtseva *et al.* [1988; 1991]; Brykov [1989]; Kulikova and Kolotukhina [1989; 1991]; Lukyanova and Evtushenko [1989]; Ovsyannikova [1989; 2004; 2010a; b]; Selin [1989]; Varaksin and Naidenko [1989]; Brykov and Selin [1990]; Karpenko and Tyurin [1990]; Motavkin *et al.* [1990]; Tyurin [1990]; Grigoryeva and Regulev [1991]; Karaseva [1993]; Karaseva and Medvedeva [1993]; Kashin and Maslennikov [1993]; Khristoforova *et al.* [1993]; Pozdnyakova and Silina [1993]; Radashevsky [1993]; Syasina and Lukyanova [1993]; Gladkov [1994]; Dolganov [1995]; Dzyuba and Leibson [1995]; Shulkin and Kavun [1995]; Kang K.H *et al.* [1996]; Khristoforova [1996]; Lukyanova and Martemyanova [1996]; Syasina *et al.* [1996; 1997]; Chang Y.J. *et al.* [1997]; Dolganov and Pudovkin [1997]; Korn and Kulikova [1997]; Pozdnyakova *et al.* [1997]; Vaschenko *et al.* [1997; 2000]; Jeon *et al.* [1998]; Gabaev and Kolotukhina [1999]; Kang K.-H. and Kim [1999]; Kim J.-J. and Park [1999]; Semenikhina *et al.* [1999]; Afeichuk and Didenko [2000]; Ozolinsh and Kupriyanova [2000]; Park Y.-J. *et al.* [2000; 2001a; b; 2006; 2009]; Yavnov [2000]; Chee *et al.* [2001]; Kim M.-J. *et al.* [2001]; Gayko [2002;

2004; 2006]; Polyakova [2002]; Brykov *et al.* [2003]; Ovsyannikova and Levenetz [2003; 2004]; Tyurin and Drozdov [2003]; Fedoseev and Grigoryeva [2004]; Levenetz and Ovsyannikova [2004]; Pravdoukhina and Kodolova [2004]; Silina and Belcheva [2004]; Belogurova and Maslennikov [2005; 2010]; Gabaev *et al.* [2005]; Gavrilova *et al.* [2005]; Grigoryeva [2005]; Grigoryeva *et al.* [2005]; Ivin and Kalashnikov [2005; 2007]; Levenetz *et al.* [2005; 2010]; Ovsyannikov and Sidyakov [2005]; Silina and Latypov [2005]; Vyshkvartsev *et al.* [2005]; Belcheva *et al.* [2006]; Ivin *et al.* [2006]; Radovets and Khristoforova [2006]; Sokolenko *et al.* [2006]; Tokmakova *et al.* [2006]; Rakov *et al.* [2007]; Sedova *et al.* [2007]; Silina and Zhukova [2007a; b; 2008; 2009]; Syasina [2007]; Uddin *et al.* [2007]; Sedova and Sokolenko [2008]; Brykov and Kolotukhina [2009]; Jo *et al.* [2009]; Levenetz [2010]; Mok *et al.* [2010].

119. *Argopecten irradians* (Lamarck, 1819)

Pl. 21, Figs. E–H

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Circumtropical-subtropical.
Comments: The type locality of this species, known as the “Atlantic bay scallop”, is Massachusetts, USA; the type material is figured by Dijkstra [1994]. Its original range of distribution is from eastern Canada to Florida, Gulf of Mexico, Caribbean, Central America, and South America (Colombia) [Mikkelsen and Bieler, 2008]. This species was first introduced to China in the 1980s [Zhang *et al.*, 1991] and later to Korea [Lee J.-S. *et al.*, 2010].

Biology and ecology: Oh B.S. and Jung [1999]; Chee *et al.* [2001]; Kim M.-J. *et al.* [2001]; Oh B.-S. *et al.* [2002a; b; c; 2003a; b]; Kim S.-Y. *et al.* [2010].

120. *Delectopecten macrocheiricola* (Habe, 1951)

Regional distribution: SK: Gangwon.
Zonal-biogeographical characteristics: Subtropical.

121. *Delectopecten randolphi* (Dall, 1897)

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: Coan *et al.* [2000] recognized only one species of the genus in the Northern Pacific, *Delectopecten vancouverensis* (Whiteaves, 1893), and regarded *D. randolphi* as its synonym. Although Scarlato [1981] did not record this species in MNP, *D. randolphi* was recently found in Tatarsky Strait [Perveyeva, 2008].

Biology and ecology: Scarlato [1960; 1981]; Ivin *et al.* [2006].

122. *Decatopecten striatus* (Schumacher, 1817)

Regional distribution: SK: Gangwon, “east coast” [Choe B.L. *et al.*, 1999].
Zonal-biogeographical characteristics: Tropical-subtropical.

123. *Amusium japonicum* (Gmelin, 1791)

Regional distribution: SK: “east coast” [Kwon *et al.*, 1993].
Zonal-biogeographical characteristics: Subtropical.

Biology and ecology: Son *et al.* [1996]; Kim J.-J. and Park [1999]; Kim M.-J. *et al.* [2001].

Family **Propeamussiidae** Abbott, 1954

124. *Parvamussium alaskense* (Dall, 1871)
Pl. 22, Figs. A–H

Regional distribution: SK: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Biology and ecology: Scarlato [1960; 1981].

Family **Spondylidae** Gray, 1826

125. *Spondylus* (*Spondylus*) *cruentus* Lischke, 1868
Pl. 23, Figs. A, B

Regional distribution: SK: Gyeongbuk, Gyeongnam; Ullung Is.
Zonal-biogeographical characteristics: Subtropical.

126. *Spondylus* (*Spondylus*) *longitudinalis* Lamarck, 1819

Regional distribution: SK: Gyeongbuk [Dokdo], Gyeongnam; Ullung Is.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: A synonym is *Spondylus* (*Spondylus*) *butleri* Reeve, 1856.

127. *Spondylus* (*Spondylus*) *varius* Sowerby I, 1827

Regional distribution: SK: Ullung Is. [Choe B.L. *et al.*, 1994].
Zonal-biogeographical characteristics: Tropical-subtropical.

Superfamily **PLICATULOIDEA** Gray, 1854

Family **Plicatulidae** Gray, 1854

128. *Plicatula* sp.

Regional distribution: SK: Gyeongbuk.

Superfamily **LIMOIDEA** Rafinesque, 1815

Family **Limidae** Rafinesques, 1815

129. *Limaria* (*Limaria*) *hakodatensis* (Tokunaga, 1906)
Pl. 15, Figs. I, J

Regional distribution: SK: Gangwon, Gyeongbuk; Ullung Is.
Zonal-biogeographical characteristics: Subtropical.
Comments: This species described by Tokunaga [1906] was synonymized by some authors with *Limaria* (*Limaria*) *basilanica* (Adams and Reeve, 1850) [Bernard *et al.*, 1993] or *Limaria* (*Limaria*) *orientalis* (Adams and Reeve, 1850) [Choe B.L. *et al.*, 1994; Higo *et al.*, 1999]. According to Oyama [1980], the distributional range of *L. hakodatensis* extends to the western Okinawa Islands, while Hayami [2000] limits it from southern Hokkaido to Kyushu. Kuroda *et al.* [1971] and Habe [1977a] first considered *L. hakodatensis* as a distinct species; but later Habe [1981] synonymized it and *L. orientalis* with *L. basilanica.* The relationships between these species are in need of detailed taxonomic study. Type materials of *L. orientalis* and *L. basilanica* are figured by Higo *et al.* [2001].

130. *Limatula* (*Limatula*) *kurodai* (Oyama, 1943)

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.

131. *Limatula* (*Limatula*) *subauriculata* (Montagu, 1808)

Regional distribution: SP.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: Coan *et al.* [2000] state that part of the records of *L. subauriculata* from the Pacific, including Scarlato [1960], belongs to *Limatula* (*Limatula*) *attenuata* Dall, 1916.

Biology and ecology: Scarlato [1960; 1981].

132. *Limatula* (*Limatula*) *vladivostokensis* (Scarlato, 1955)

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Subtropical-boreal.
Comments: *Limatula macleani* Bernard, 1988, regarded by Coan *et al.* [2000] as a synonym of *Limatula* (*Limatula*) *saturna* Bernard, 1978, may be a species similar to *L. vladivostokensis*.

Biology and ecology: Scarlato [1981].

Superfamily **LUCINOIDEA** J. Fleming, 1828

Family **Lucinidae** J. Fleming, 1828

133. *Pillucina pisidium* (Dunker, 1860)
Pl. 24, Figs. A, B

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam; **SP**.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: Glover and Taylor [2001] found out that this species is widely distributed in the Indo-Pacific, from Japan to eastern Africa and Madagascar, and to Australia and New Caledonia. Its synonyms include *Lucina parvula* Gould, 1861 (non *Lucina parvula* Muenster, 1835) and *Sydlorina symbolica* Iredale, 1930.

Biology and ecology: Golikov and Scarlato [1967]; Evseev [1981]; Rodionov and Yushin [1991].

134. *Pillucina neglecta* Habe, 1960

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

135. *Pillucina yamakawai* (Yokoyama, 1920)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: Glover and Taylor [2001] stated that this species probably belongs to the genus *Parvilucina* Dall, 1901, and can be easily distinguished from *Pillucina* Pilsbry, 1921 by the absence of an internal ligament.

136. *Lucinoma acutilineatum* (Conrad, 1849)

Regional distribution: SK: Ulsan.
Zonal-biogeographical characteristics: Widely distributed boreal.

137. *Lucinoma yoshidai* Habe, 1958

Regional distribution: SK: "east coast" [Min D.-K. *et al.*, 2004].
Zonal-biogeographical characteristics: Subtropical.

138. *Wallucina striata* (Tokunaga, 1906)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.

139. *Gonimyrtea japonicum* (Habe, 1958)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

140. *Divalucina soyoae* Habe, 1952

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

Superfamily **THYASIROIDEA** Dall, 1900

Family **Thyasiridae** Dall, 1900

141. *Axinopsida subquadrata* (A. Adams, 1862)
Pl. 25, Figs. E, F

Regional distribution: SK: Gangwon, Gyeongbuk; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Comments: The relationship of this species with *Axinopsida serricata* (Carpenter, 1864) (claimed to be distributed in the western Pacific from Kamchatka to northern Japan, and a possible junior synonym of *A. subquadrata* [Coan *et al.*, 2000]) and European Arctic *Axinopsida orbiculata* (G.O. Sars, 1878) are not clear.

Biology and ecology: Golikov and Scarlato [1967]; Evseev [1981]; Scarlato [1981]; Lutaenko [2002; 2005a]; Lutaenko *et al.* [2003]; Moshchenko and Belan [2005].

142. *Adontorhina filatovae* (Ivanova et Moskaletz, 1984)

Regional distribution: SP; **MNP** (Tatarsky Strait).
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: We prefer to distinguish Asian "*Genaxinus*" *filatovae* Ivanova et Moslaletz, 1984 from *Adontorhina cyclia* Berry, 1947, inhabiting the Pacific coast of the North America, although Kamenev [1996] synonymized these species. Güller and Zelaya [2011] did not list the former species among five known species of *Adontorhina.*

Biology and ecology: Ivanova and Moskaletz [1984]; Moskaletz [1984]; Kamenev [1996]; Lutaenko [2005a].

143. *Mendicula ferruginosa* (Forbes, 1844)

Regional distribution: SP.
Zonal-biogeographical characteristics: Widely distributed boreal and circumboreal.
Comments: Zelaya [2010] believes that records of *M. ferruginosa* from the North Pacific [Coan *et al.*, 2000; Kamenev and Nadtochy, 2000] are based on specimens having a strong posterior enlargement in the hinge plate, and this morphology does not correspond with that of *M. ferruginosa* and genus *Mendicula* at all; instead, this condition appears in *Odontogena* Cowan, 1964 which may be a valid, distinct taxon. Additional studies are needed to understand the status of specimens from the Sea of Japan/East Sea.
Biology and ecology: Kamenev and Nadtochy [2000]; Lutaenko [2005a]; Belan T. and Belan [2008].

144. *Thyasira flexuosa* (Montagu, 1803)[4]

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Comments: "*Thyasira gouldi*" (=*Lucina gouldii* R.A. Philippi, 1845) and "*Thyasira sarsi*" (=*Axinus sarsii* R.A. Philippi, 1845) recorded from Peter the Great Bay [Scarlato, 1981; Moskaletz, 1984; Lebedev *et al.*, 2004] are both synonyms of this species [Coan *et al.*, 2000].
Biology and ecology: Lutaenko [2005a].

145. *Thyasira tokunagai* Kuroda et Habe, 1951

Regional distribution: SK: Gyeongbuk, Gyeongnam; Ulsan; **NK**: Hamnam, Gangwon.
Zonal-biogeographical characteristics: Subtropical.
Comments: This species was recorded in bottom communities in Masan Bay, Wolseong, and Ulsan Bay in SK [Yi *et al.*, 1982; Hong and Lee, 1983; Seo *et al.* 2009]. *T. tokunagai* does not inhabit Russian waters of the Sea of Japan/East Sea, and its records there [Evseev, 1981] may refer to *C. bisecta.*

146. *Conchocele bisecta* (Conrad, 1849)

Pl. 25, Figs. G–J; Pl. 26, Figs. A, B

Regional distribution: SK: Ulsan; **SP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: *Conchocele scarlatoi* Ivanova et Moskaletz, 1984, described from Peter the Great Bay is a synonym of this species [Kamenev *et al.*, 2001]. This species was recorded from SK as *Conchocele disjuncta* Gabb, 1866 [Min D.-K. *et al.*, 2004, with authorship "(Gabb, 1931)" in error] which is a synonym of *C. bisecta* [Coan *et al.*, 2000; Kamenev *et al.*, 2001].
Biology and ecology: Kamenev *et al.* [2001].

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[4] The status of "*Thyasira equalis* (Verrill et Bush, 1898)" recorded for Peter the Great Bay [Moskaletz, 1984; Lebedev *et al.*, 2004] is unclear; it is an Atlantic species [Payne and Allen, 1991; Allen, 2008].

Superfamily **CARDITOIDEA** Férussac, 1822

Family **Carditidae** Férussac, 1822

147. *Cardita leana* Dunker, 1860
Pl. 29, Figs. I, J

Regional distribution: SK: Gyeongbuk, Gyeongnam, Busan.
Zonal-biogeographical characteristics: Tropical-subtropical.

148. *Cyclocardia* (*Cyclocardia*) *rjabininae* (Scarlato, 1955)
Pl. 29, Figs. A–D; Text-fig. 16

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Biology and ecology: Scarlato [1981]; Lutaenko [2005a].

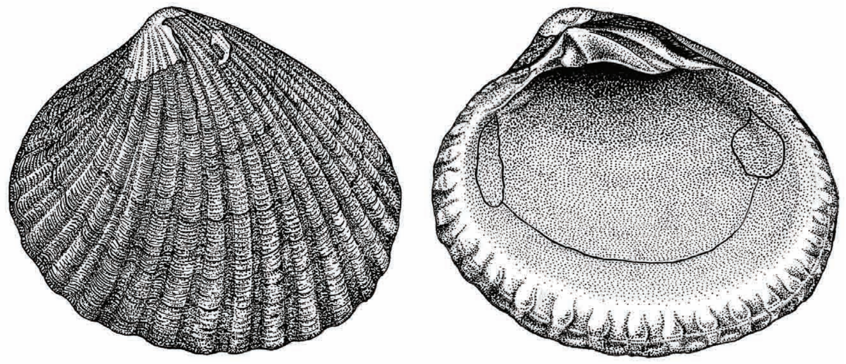

Fig. 16. *Cyclocardia* (*Cyclocardia*) *rjabininae* (Scarlato, 1955): SP, Peter the Great Bay, Furugelma Island, depth 150 m, shell length 24.4 mm, ZMFU 31869/Bv-5007.

149. *Cyclocardia* (*Cyclocardia*) *ferruginea* (Clessin, 1888)
Pl. 28, Figs. I–L

Regional distribution: SK: Gangwon, Gyeongbuk; ?**MNP**.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: Although this species was found in SK [Popov, 1983; Lutaenko *et al.*, 2003; Min D.-K. *et al.*, 2004], in Russian waters of the north-western Pacific it was recorded only from the South Kurile Islands [Scarlato, 1981; Popov, 1983] but it may occur in MNP (Pl. 28, Figs. I–L).

150. *Cyclocardia* (*Cyclocardia*) *isaotakii* (Tiba, 1972)

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: Although Scarlato [1981] recorded this species only for SP, Popov [1983] found it in MNP. The holotype is figured by Higo *et al.* [2001].
Biology and ecology: Scarlato [1981]; Popov [1983].

151. *Cyclocardia* (*Crassicardia*) *crassidens* (Broderip et Sowerby I, 1829)
Pl. 29, Figs. E–H

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Biology and ecology: Scarlato [1981]; Popov [1983].

152. *Megacardita ferruginosa* (Adams et Reeve, 1850)

Regional distribution: SK: Gangwon.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: A syntype is figured by Higo *et al.* [2001].

153. *Megacardita koreana* Habe et Ito, 1965

Regional distribution: SK: Gangwon, Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.
Comments: The holotype is figured by Higo *et al.* [2001].

154. *Megacardita coreensis* (Deshayes, 1854)
Pl. 28, Figs. M, N

Regional distribution: SK: Gyeongbuk, Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.
Comments: A possible syntype is figured by Higo *et al.* [2001].
Biology and ecology: Lee Y.G. [1998].

155. *Miodontiscus annakensis* (Oinomikado, 1938)

Regional distribution: SK: "east coast" [Min D.-K. *et al.*, 2004]; **SP**; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: "*Miodontiscus prolongatus* (Carpenter, 1864)" [Min D.-K. *et al.*, 2004, fig. 1393] is a misidentification of *M. annakensis.*

Superfamily **CRASSATELLOIDEA** Férussac, 1822

Family **Crassatellidae** Férussac, 1822[5]

156. *Eucrassatella* (*Nipponocrassatella*) *adamsi* (Kobelt, 1886)

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.

157. *Eucrassatella* (*Nipponocrassatella*) *sagamiensis*
Kuroda et Habe in Kuroda, Habe et Oyama, 1971

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

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[5] Lutaenko *et al.* [2003] additionally recorded *Nipponocrassatella* sp. from Yeongil Bay (Pl. 28, Figs. E, F).

158. *Salaputium* cf. *unicum* Hayami et Kase, 1993

Pl. 28, Figs. A–D

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.
Comments: This small-sized crassatellid, rarely exceeding 3 mm in maximum length, was described from subtidal caves of Ie, Shimoji, and Irabu Islets, Ryukyu Islands [Hayami and Kase, 1993], which was the only locality of the species until Lutaenko *et al.* [2003] recorded this species from Yeongil Bay. However, it was observed that specimens from the latter locality have a slightly concave posterodorsal margin, while specimens from the Ryukyu Islands exhibit a slightly convex posterodorsal margin, and bear more sharp commarginal lamellae on the shell surface.

159. *Indocrassatella* cf. *oblongata* (Yokoyama, 1920)

Pl. 28, Figs. G, H

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.

Family **Astartidae** d'Orbigny, 1844

160. *Astarte elliptica* (T. Brown, 1827)

Pl. 27, Figs. E–H; Text-fig. 17

Regional distribution: SK: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Comments: *Astarte alaskensis* Dall, 1903 is a synonym of this species [Coan *et al.*, 2000]. "*Tridonta* (*Tridonta*) *esquimalti* (W. Baird, 1863)" (=*Astarte esquimalti*) figured by Min D.-K. *et al.* [2004, fig. 1405], probably, belongs to this species; *A. esquimalti* (=*Rictocyma zenkewitchi* Filatova, 1957) occurs only in the Bering, Beaufort, and Chukchi seas, and south to Puget Sound, Washington [Scarlato, 1981; Coan *et al.*, 2000].

Biology and ecology: Evseev [1981]; Scarlato [1981].

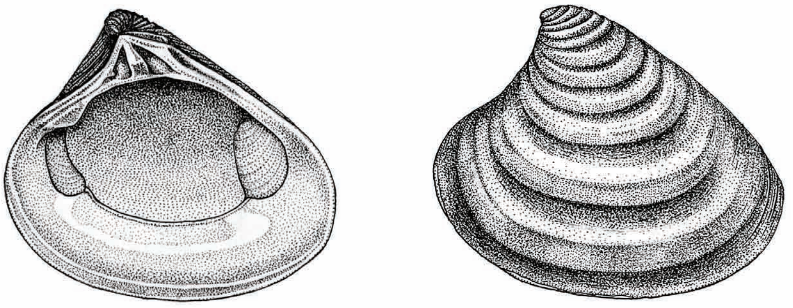

Fig. 17. *Astarte elliptica* (T. Brown, 1827): SP, Peter the Great Bay, Bolshoy Pelis Island, depth 72 m, shell length 10.6 mm, ZMFU 31873/Bv-5011.

161. *Astarte montagui* (Dillwyn, 1817)
Pl. 26, Figs. G–J

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Biology and ecology: Evseev [1981]; Scarlato [1981].

162. *Astarte borealis* (Schumacher, 1817)
Pl. 27, Figs. A–D

Regional distribution: SK: Gangwon; **NK**: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Comments: "*Tridonta* (*Tridonta*) *filatovae* (Habe, 1964)" (=*Astarte crenata* (J. E. Gray, 1824) with a large synonymy, see Coan *et al.* [2000]; *Astarte filatovae* Habe, 1964, a *nom. nov*. for *Astarte multicostata* Filatova, 1957), figured by Min D.-K. *et al.* [2004, fig. 1404], is *A. borealis. A. crenata* does not occur in the Sea of Japan/East Sea, being known from the Beaufort, Chukchi, and northern Bering seas, and in the northern Atlantic [Coan *et al.*, 2000]. "*Tridonta* (*Tridonta*) *bennettii* (Dall, 1903)" (=*Astarte benettii*, a synonym of *Astarte vernicosa* Dall, 1903), figured by Min D.-K. *et al.* [2004, fig. 1402] is likely *A. borealis* also; however, *A. vernicosa* appears to inhabit the Sea of Japan/East Sea [Coan *et al.*, 2000], although Scarlato [1981; as *Nicania montagui vernicosa*] recorded this species only as far south as the Sea of Okhotsk. The taxonomy and nomenclature of the *A. borealis* complex is extremely difficult, with many synonyms and new species recently described to be re-assessed [Petersen, 2001; Zettler, 2001].
Biology and ecology: Scarlato [1981]; Evseev and Kiyashko [1999].

163. *Astarte hakodatensis* Yokoyama 1920
Pl. 26, Figs. C–F

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.
Biology and ecology: Lutaenko *et al.* [2003].

Superfamily **ARCTICOIDEA** Newton, 1891

Family **Trapezidae** Lamy, 1920

164. *Trapezium* (*Neotrapezium*) *liratum* (Reeve, 1843)
Pl. 30, Figs. O–R; Text-fig. 18

Regional distribution: SK: Busan; **NK**; Hambuk; **SP**.
Zonal-biogeographical characteristics: Tropical-subtropical.
Biology and ecology: Evseev [1981]; Yavnov [2000]; Lutaenko [2004a]; Drozdov *et al.* [2009].

165. *Coralliophaga coralliophaga* (Gmelin, 1791)

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Tropical-subtropical.

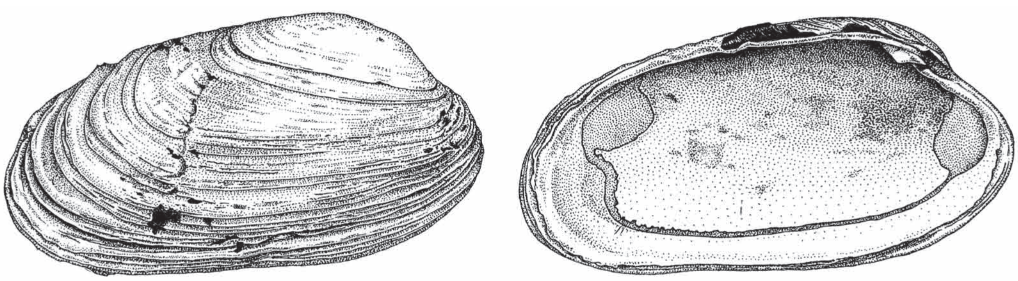

Fig. 18. *Trapezium* (*Neotrapezium*) *liratum* (Reeve, 1843): SP, Amursky Bay, Uglovoy Bay, shell length 37.6 mm, ZMFU 10143/Bv-578.

Superfamily **CARDIOIDEA** Lamarck, 1809

Family **Cardiidae** Lamarck, 1809

166. *Clinocardium* (*Clinocardium*) *nuttallii* (Conrad, 1837)

Regional distribution: **SK**: Gangwon.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: This species in the north-western Pacific is known mostly from high-boreal regions and south to southern Sakhalin and Hokkaido [Scarlato, 1981; Kafanov, 1998], and has not been recorded from the Russian part of the Sea of Japan/East Sea.

167. *Clinocardium* (*Ciliatocardium*) *ciliatum* (Fabricius, 1780)
Pl. 31, Figs. E–H; Text-fig. 19

Regional distribution: **SK**: Gangwon, Gyeongbuk; **NK**: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Biology and ecology: Evseev [1981]; Scarlato [1981]; Yavnov [2000].

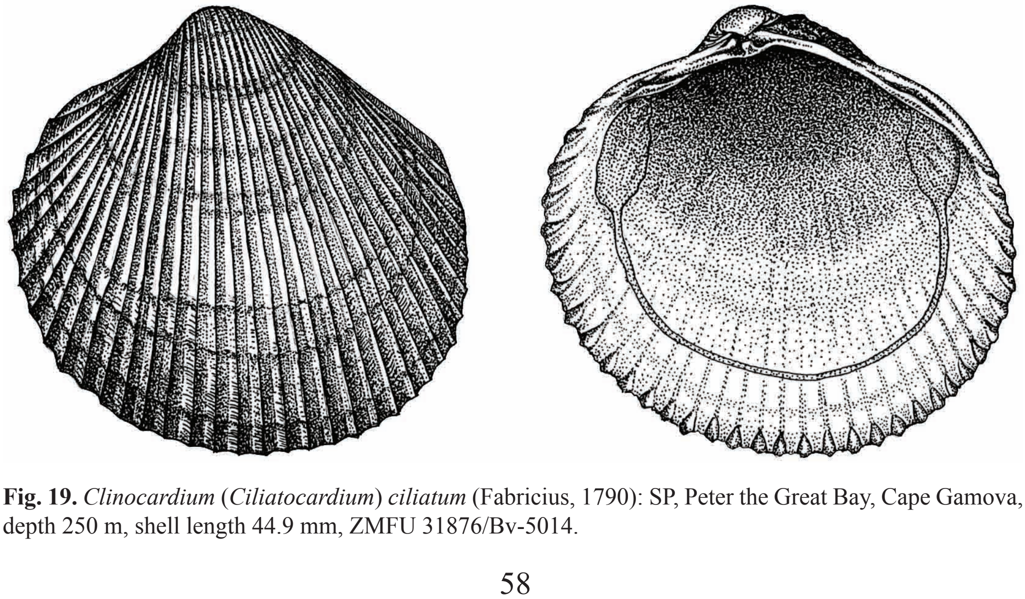

Fig. 19. *Clinocardium* (*Ciliatocardium*) *ciliatum* (Fabricius, 1790): SP, Peter the Great Bay, Cape Gamova, depth 250 m, shell length 44.9 mm, ZMFU 31876/Bv-5014.

168. *Clinocardium* (*Ciliatocardium*) *likharevi* Kafanov in Scarlato, 1981

Pl. 31, Figs. A–D

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: Coan *et al.* [2000] provisionally synonymized this species with *C. ciliatum.*

169. *Clinocardium* (*Keenocardium*) *californiense* (Deshayes, 1839)

Pl. 32, Figs. A–D

Regional distribution: SK: Gangwon; Gyeongbuk; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: Kafanov [1999c] subdivided this species into three subspecies: *C. californiense californiense*, *C. californiense uchidai* Habe, 1955, and *C. californiense middendorffi* (Kafanov, 1999), based on the geographical variation in rib number and the valve convexity/length ratio. Specimens collected from Yeongil Bay differ from the southern subspecies *C. californiense uchidai* by the thin, interiorly colored shell with a lesser number (32–34) of sparsely spaced radial ribs, and the ratio of convexity/length is between 0.52 and 0.72 (0.59 on average) in measured specimens [Lutaenko *et al.*, 2003]. The number of ribs on specimens of *C. californiense* collected in the Okhotsk and Japan seas is between 34 and 56, but mostly about 43–51 [Lutaenko *et al.*, 2003] and this figure is close to that of Kafanov [1999c; 39–61 ribs, most often 43–53]. This allows us to suggest that Korean population may belong to a distinct, as-yet unnamed species, and Kafanov [2004] did not rule out this possibility. A syntype is figured by Lutaenko and Héros [2011].

Biology and ecology: Zolotarev [1976; 1980; 1989]; Popov [1977]; Kafanov [1979]; Evseev [1981]; Scarlato [1981]; Kasyanov *et al.* [1983]; Kulikova and Kolotukhina [1989]; Selin [1993]; Yavnov [2000]; Yavnov and Ignatiev [2009].

170. *Clinocardium* (*Keenocardium*) *buelowi* (Rolle, 1896)

Regional distribution: SK: Gangwon.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: Although this species is known from Korea and both sides of Japan north to Hokkaido [Higo *et al.*, 1999; Kafanov, 1999c], it was never recorded from the Russian coast of the Sea of Japan/East Sea. We believe that some of the Korean records of *C. californiense* refer, in fact, to *C. buelowi*, which differs clearly from *C. californiense* in the lack of a keel twist on the posterior area of the valves and in having fewer ribs (37–38) [Kafanov, 1999c]. Illustrations in Yoo J.-S. [1976, pl. 29, figs. 10–11] and Kwon and Lee [1999, text-fig. on p. 75] might belong to *C. buelowi*. Coan *et al.* [2000] suggested that the relationship of *C. californiense uchidai* to *C. buelowi* has yet to be fully resolved.

171. *Serripes* (*Serripes*) *groenlandicus* (Mohr, 1796)
Pl. 32, Figs. E–H; Pl. 33, Figs. A–D

Regional distribution: SK: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Biology and ecology: Zolotarev [1976; 1980; 1989]; Evseev [1981]; Yavnov [2000]; Bobovsky [2008]; Yavnov and Ignatiev [2009].

172. *Serripes* (*Serripes*) *laperousii* (Deshayes, 1839)

Regional distribution: SK: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.

173. *Serripes* (*Yagudinella*) *notabilis* (Sowerby III, 1915)

Regional distribution: SK: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: Scarlato [1981] noted that this species is known in MNP south to Kievka Bay; it was later found in Peter the Great Bay [Lutaenko, 2005a]. The holotype is figured by Higo *et al.* [2001].
Biology and ecology: Scarlato [1981]; Yavnov [2000].

174. *Acrosterigma* (*Vasticardium*) *burchardi* (Dunker, 1877)

Regional distribution: SK: “east coast” [Kwon *et al.*, 1993].
Zonal-biogeographical characteristics: Tropical-subtropical.

175. *Microcardium sakuraii* (Habe, 1961)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

176. *Fulvia mutica* (Reeve, 1844)
Pl. 33, Figs. E, F

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam, Busan.
Zonal-biogeographical characteristics: Subtropical.
Comments: A syntype is figured by Higo *et al.* [2001].
Biology and ecology: Chang Y.J. and Lee [1982]; Kim C.W. *et al.* [2006].

177. *Keenaea samarangae* (Makiyama, 1934)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

Superfamily **CHAMOIDEA** Lamarck, 1809

Family **Chamidae** Lamarck, 1809

178. *Chama fraga* Reeve, 1846
Pl. 30, Figs. A, B

Regional distribution: SK: Gyeongnam, Busan.
Zonal-biogeographical characteristics: Tropical-subtropical.

179. *Chama limbula* Lamarck, 1819

Regional distribution: SK: Gyeongbuk [Dokdo].
Zonal-biogeographical characteristics: Tropical-subtropical.

180. *Pseudochama retroversa* (Lischke, 1870)

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Tropical-subtropical.

Superfamily **GALEOMMATOIDEA** Gray, 1840

Family **Galeommatidae** Gray, 1840[6]

181. *Scintilla violescens* Kuroda et Iw. Taki, 1961

Regional distribution: SK: Gangwon, Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.

Family **Lasaeidae** Gray, 1842[7]

182. *Mysella planata* (Krause, 1885)

Regional distribution: SP.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Biology and ecology: Scarlato [1981]; Lutaenko [2005a].

183. *Mysella ventricosa* Scarlato, 1981

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.

184. *Lasaea undulata* (Gould, 1861)

Regional distribution: SK: Gyeongbuk [Dokdo], Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

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[6] Taxonomy of this family is unclear and assignment of genera and species to the family is provisional.

[7] Kelliidae Forbes et Hanley, 1849 and Montacutidae W. Clark, 1855, often used in regional literature, are both synonyms of this family; there is as yet insufficient information to divide this family into supported clades [Bieler *et al.*, 2010]. There are additional records of *Borniola* sp. (Pl. 30, Figs. M, N) and *Montacutona* sp. from the Korean coast not idenfified to species level [Lutaenko *et al.*, 2003].

185. *Kellia japonica* Pilsbry, 1895

Pl. 30, Figs. C–F

Regional distribution: SK: Gyeongnam; **SP**; **MNP**.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: *Kellia porculus* Pilsbry, 1904, recorded for the Korean coast by Kwon *et al.* [2001], seems to be a thickened form of *K. japonica*; the former possesses much heavier teeth and a thicker, more inflated shell [Morton and Scott, 1989]. Coan *et al.* [2000] synonymized *K. japonica* with circumboreal *Kellia suborbicularis* Montagu, 1803.
Biology and ecology: Kasyanov *et al.* [1983]; Kulikova and Kolotukhina [1989].

186. *Borniopsis tsurumaru* Habe, 1959

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: It is assigned by some authors to the genus *Pseudopythina* Fischer in Monterosato, 1884.

187. *Nipponomysella obesa* Habe, 1960

Pl. 30, Figs. G, H

Regional distribution: SK: "east coast" [Min D.-K. *et al.*, 2004]; **SP**.
Zonal-biogeographical characteristics: Subtropical.
Comments: The status of *Nipponomysella volovae* Martynov and Tschernyshev, 1993 from Peter the Great Bay is unclear. There may be several species of this genus in Russian waters of the Sea of Japan/East Sea. A paratype of *N. obesa* is figured by Higo *et al.* [2001].
Biology and ecology: Golikov and Scarlato [1967].

188. *Nipponomysella oblongata* (Yokoyama, 1922)

Pl. 30, Figs. I, J

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.

189. *Nipponomysella* cf. *subtruncata* (Yokoyama, 1927)

Pl. 30, Figs. K, L

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.

190. *Peregrinamor ohshimai* Shoji, 1938

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.
Comments: This species was recently recorded for SK in Chilcheondo Island [Kil and Park, 2009]. The holotype is figured by Higo *et al.* [2001].

Superfamily **CYRENOIDEA** Gray, 1840

Family **Glauconomidae** Gray, 1853

191. *Glauconome chinensis* Gray, 1828

Regional distribution: SK: Busan.
Zonal-biogeographical characteristics: Subtropical.

Superfamily **GLOSSOIDEA** Gray, 1847

Family **Glossidae** Gray, 1847

192. *Meiocardia samarangiae* Bernard, Cai et Morton, 1993

Regional distribution: SK: “south-eastern coast” [Kwon *et al.*, 1993].
Zonal-biogeographical characteristics: Subtropical.
Comments: *Isocardia tetragona* Adams and Reeve, 1850, a name long used for this species (as *Meiocardia tetragona*), is a primary junior homonym of *Isocardia tetragona* Koch et Dunker, 1837; the replacement name is *M. samarangiae* [Matsukuma and Habe, 1995].

Family **Kelliellidae** P. Fischer, 1887

193. *Alveinus ojianus* (Yokoyama, 1927)
Pl. 30, Figs. S, T

Regional distribution: SK: Gangwon [Choi J.-W. *et al.*, 2000]; Gyeongnam; Busan; **SP**.
Zonal-biogeographical characteristics: Subtropical.

Biology and ecology: Golikov and Scarlato [1967]; Lutaenko [2003a]; Lutaenko *et al.* [2003]; Evseev *et al.* [2004a; c]; Moshchenko and Belan [2005].

Superfamily **MACTROIDEA** Lamarck, 1809

Family **Mactridae** Lamarck, 1809

194. *Mactra* (*Mactra*) *chinensis* Philippi, 1846
Pl. 54, Figs. E–J; Text-fig. 20

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam, Busan; **NK**: Hamnam, Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Subtropical-lowboreal.

Biology and ecology: Golikov and Scarlato [1967]; Lee E.-H. *et al.* [1970]; Avdeev [1975]; Biryulina [1975]; Kasyanov *et al.* [1976; 1980; 1983]; Lee T.Y. and Son [1978]; Vasilieva [1978]; Yavnov and Ignatiev [1979]; Yavnov [1980; 2000]; Zolotarev [1980; 1989]; Tarasov *et al.* [1982]; Medvedeva and Malakhov [1983]; Rybakov [1983a; 1986]; Drozdov and Kasyanov [1985]; Kulikova and Kolotukhina [1989]; Selin [1990a; 1999c]; Khim *et al.* [2000]; Kim J.H. and Yoo [2002]; Tyurin and Drozdov [2005b]; Tokmakova *et al.* [2006]; Chung E.-Y. *et al.* [2007a]; Bobovsky [2008]; Park H.W. and Zhang [2008]; Mok *et al.* [2010].

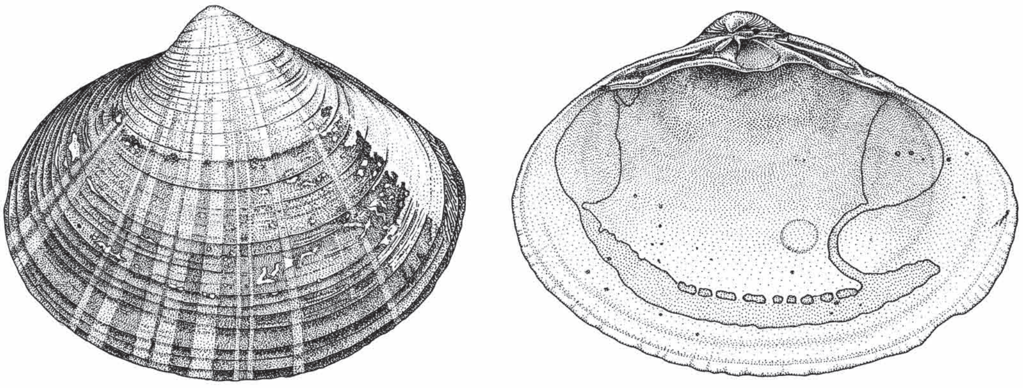

Fig. 20. *Mactra* (*Mactra*) *chinensis* Philippi, 1846: SP, Peter the Great Bay, Popova Island, shell length 75.1 mm, ZMFU 6581/Bv-4496.

195. *Mactra* (*Mactra*) *quadrangularis* Deshayes in Reeve, 1854

Pl. 55, Figs. A–D

Regional distribution: SK: Gangwon, Gyeongnam, Busan; **SP**.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: The name *Mactra veneriformis* Deshayes, 1854, used for a long time for this species, is preoccupied by *Mactra veneriformis* Wood, 1828 [Matsukuma, 2001].

Biology and ecology: Lee C. *et al.* [1969]; Chang S.-D. and Chin [1978]; Yavnov [1980; 2000]; Kim J.H. and Yoo [2002]; Kim I.-H. [2004]; Lutaenko [2004a]; Hur *et al.* [2005]; Moshchenko and Belan [2005]; Min B.-H. and Kim [2010]; Min B.-H. and Shin [2010]; Mok *et al.* [2010].

196. *Mactra* (*Mactra*) *nipponica*
Kuroda et Habe in Kuroda, Habe et Oyama, 1971

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.
Comments: The holotype is figured by Higo *et al.* [2001].

197. *Spisula* (*Pseudocardium*) *sachalinensis* (Schrenck, 1861)

Pl. 56, Figs. E–H; Text-fig. 21

Regional distribution: SK: Gangwon, Gyeongbuk; **SP**; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: Surprisingly, Higo *et al.* [1999] and Min D.-K. *et al.* [2004] used the supressed name *Mactra sybillae* Valenciennes, 1858 (as *Pseudocardium sybillae*). Discovery of the type material of *M. sybillae*, a senior synonym of *S. sachalinensis* [Habe, 1978; see also: Kantor and Sysoev, 2002] led to the decision of the ICZN to suppress the former name and conserve the prevailing usage of *S. sachalinensis* [Kafanov, 1983; Melville, 1985].

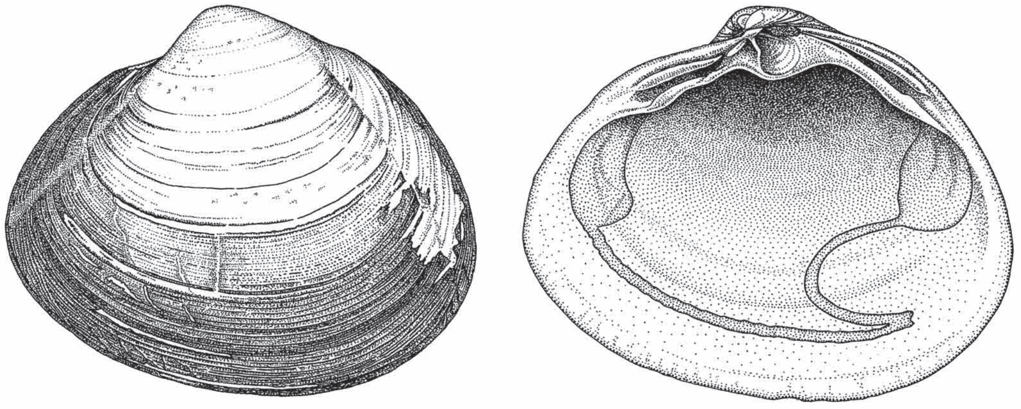

Fig. 21. *Spisula* (*Pseudocardium*) *sachalinensis* (Schrenck, 1861): SP, Ussuriysky Bay, Lazurnaya (Shamora) Bay, shell length 84.8 mm, ZMFU 26583/Bv-4498.

Biology and ecology: Razin [1927; 1931]; Ivanov [1930]; Golikov and Scarlato [1967; 1970]; Smirnova [1973]; Avdeev [1975]; Biryulina [1975]; Leibson and Movchan [1975]; Medvedeva [1976]; Zolotarev [1976; 1980; 1989]; Vasilieva [1978]; Yavnov and Ignatiev [1979]; Kasyanov *et al.* [1980; 1983]; Yavnov [1980; 2000; 2009]; Drozdov and Kasyanov [1985]; Malakhov and Medvedeva [1986; 1991]; Rybakov [1986]; Kulikova and Kolotukhina [1989]; Selin [1990a; 1999c]; Kalashnikova and Aizdaicher [1993]; Lee J.Y. *et al.* [1996; 1997; 2002a; b; c; d; 2003a; b]; Silina and Pozdnyakova [1996]; Korn and Kulikova [1997]; Khim *et al.* [2000]; Kim J.H. and Yoo [2002]; Ponurovsky *et al.* [2005]; Sokolenko and Sedova [2005; 2008]; Sokolenko *et al.* [2006; 2010]; Tokmakova *et al.* [2006]; Sedova *et al.* [2007]; Lee K.-Y. *et al.* [2008]; Sokolenko [2008]; Mok *et al.* [2010].

198. *Mactromeris polynyma* (Stimpson, 1860)

Pl. 56, Figs. A–D

Regional distribution: SK: Gangwon; **NK**: Hamnam, Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.

Biology and ecology: Zolotarev [1976; 1989]; Yavnov and Ignatiev [1979]; Yavnov [1980; 2000]; Evseev [1981].

199. *Raeta* (*Raetellops*) *pulchella* (Adams et Reeve, 1850)

Pl. 57, Figs. A–D

Regional distribution: SK: Gangwon; Gyeongbuk, Busan, Ulsan; **NK**: Gangwon; **SP**.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: Golikov and Scarlato [1967] noted that the distributional range of this species is very wide; the type locality is Borneo. According to Higo *et al.* [1999], the range extends as far south as the South China Sea and Australia, and this species may represent a complex of species.

Biology and ecology: Golikov and Scarlato [1967]; Evseev [1981]; Lim H.-S. and Hong [1997]; Lutaenko [2003a]; Moshchenko and Belan [2005].

200. *Coelomactra antiquata* (Spengler, 1802)

Regional distribution: NK: “east coast” [West Coast Mollusks…, 1985].
Zonal-biogeographical characteristics: Tropical-subtropical.

201. *Tresus keenae* (Kuroda et Habe, 1950)

Pl. 55, Figs. G, H

Regional distribution: SK: Gyeongbuk, Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.
Comments: Records of this species for Sakhalin and Primorye by Higo *et al.* [1999] are erroneous; this large species could not be overlooked and has never been found in Russian waters of the Sea of Japan/East Sea.

Biology and ecology: Kim D.H *et al.* [1999]; Kim J.H. and Yoo [2002]; Kim J.-H. *et al.* [2005]; Shin Y.K. and Yang [2005]; Moon *et al.* [2006].

202. *Lutraria sieboldii* Deshayes, 1854

Pl. 54, Figs. C, D

Regional distribution: SK: Busan.
Zonal-biogeographical characteristics: Tropical-subtropical.

Family **Mesodesmatidae** Gray, 1840

203. *Coecella chinensis* Deshayes, 1855

Regional distribution: SK: Busan; **NK**: Hambuk.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: A syntype is figured by is figured by Higo *et al.* [2001].

Superfamily **TELLINOIDEA** Blainville, 1814

Family **Tellinidae** Blainville, 1814[8]

204. *Cadella lubrica* (Gould, 1861)

Pl. 42, Figs. B–E; Text-fig. 22

Regional distribution: SK: Gangwon, Gyeongbuk; **SP**; **MNP**.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: The holotype is figured by Higo *et al.* [2001].

Biology and ecology: Zolotarev [1976; 1980; 1981; 1989]; Evseev [1981]; Scarlato [1981]; Yavnov [2000].

205. *Megangulus luteus* (Wood, 1828)

Pl. 50, Figs. E, F

Regional distribution: SK: Gangwon; **NK**: Hamnam, Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.

Biology and ecology: Scarlato [1981]; Rybakov [1983a]; Yavnov [2000].

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[8] The record of “*Arcopella isseli* (Adams)” (in Semelidae) from Peter the Great Bay [Lebedev *et al.,* 2004] needs special verification. This species, a tellinid, is known from Japan to the Red Sea (tropical-subtropical) [Higo *et al*., 1999].

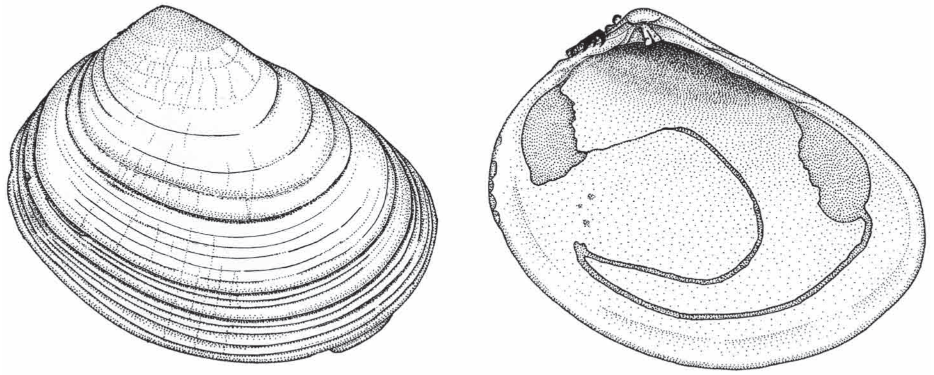

Fig. 22. *Cadella lubrica* (Gould, 1861): SP, Peter the Great Bay, Furugelma Island, shell length 15.2 mm, ZMFU 9340/Bv-236.

206. *Megangulus venulosus* (Schrenck, 1861)

Pl. 50, Figs. A–D

Regional distribution: SK: Gangwon, Gyeongbuk, Busan; **NK**: Hamnam; **SP**; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.

Biology and ecology: Golikov and Scarlato [1967]; Biryulina [1975]; Leibson and Movchan [1975]; Vasilieva [1978]; Zolotarev [1976; 1980; 1989]; Evseev [1981]; Scarlato [1981]; Rybakov [1983a; 1986]; Popov [1992]; Yavnov [2000]; Tokmakova *et al.* [2006].

207. *Megangulus zyonoensis* (Hatai et Nisiyama, 1939)

Pl. 50, Figs. G–J

Regional distribution: SK: Gangwon; **NK**: Hamnam, Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: North Korea records of all three species of *Megangulus* Afshar, 1969 are confirmed by Matsukuma *et al.* [1988].

Biology and ecology: Zolotarev [1976; 1980; 1989]; Selin [1999c]; Yavnov [2000].

208. *Macoma* (*Macoma*) *calcarea* (Gmelin, 1791)

Pl. 46, Figs. A–D; Text-fig. 23

Regional distribution: SK: Gangwon; **NK**: Hamnam, Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Comments: Kamenev and Nadtochy [1999] synonymized *Abrina tatarica* Scarlato, 1981 (originally in Semelidae), described from southern Sakhalin and known also from Kievka Bay (MNP), with this species.

Biology and ecology: Evseev [1981]; Scarlato [1981].

209. *Macoma* (*Macoma*) *balthica* (L., 1758) s.l.

Pl. 43, Figs. E–H

Regional distribution: SK: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Circumboreal.

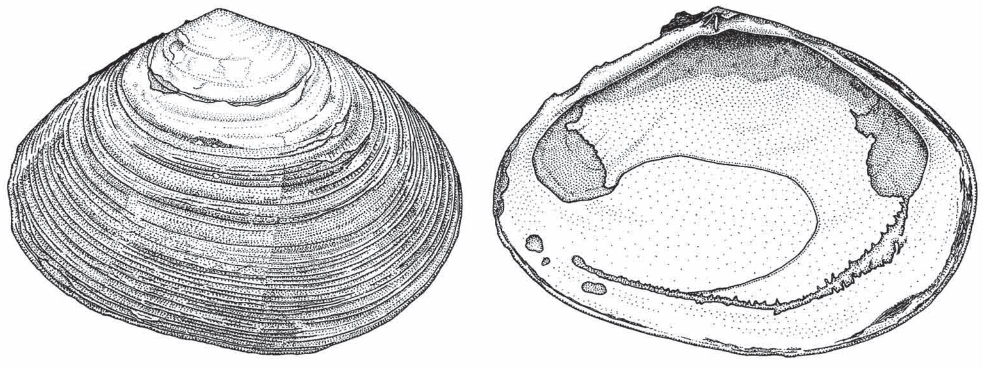

Fig. 23. *Macoma* (*Macoma*) *calcarea* (Gmelin, 1791): SP, Ussuriysky Bay, shell length 68.5 mm, ZMFU 31352/Bv-5006.

Comments: Japanese authors recognize two subspecies: *Macoma balthica takahokoensis* Yamamoto and Habe, 1959, or even a distinct species, *M. takahokoensis*, with a very limited distribution in northern Honshu [Matsukuma, 2000], and *M. balthica inconspicua* (Broderip and Sowerby, 1829), distributed in Hokkaido and northward [Higo *et al.*, 1999]. Korean workers [Min D.-K. *et al.*, 2004] recognize the former subspecies in SK, and Zatravkin and Bogatov [1987] and Starobogatov *et al.* [2004] as a distinct species in Primorye and southern Sakhalin. Moreover, the latter authors [l.c., p. 53] believe that another species of the complex, *Macoma fusca* (Say, 1826), a synonym of *M. balthica* [Coan *et al.*, 2000], is distributed in the Northern Pacific as far south as the north-western Sea of Japan/East Sea. However, *M. balthica* has at least 18 synonyms, and the relationships of regional morphs or varieties in the Pacific and Atlantic are unclear [Coan *et al.*, 2000].

Biology and ecology: Golikov and Scarlato [1967]; Evseev [1975; 1981]; Zolotarev [1976]; Rybakov [1983a]; Zatravkin and Bogatov [1987]; Kulikova and Kolotukhina [1989]; Yavnov [2000]; Moshchenko and Belan [2005].

210. *Macoma* (*Macoma*) *incongrua* (Martens, 1865)

Pl. 45, Figs. E–H; Text-fig. 24

Regional distribution: SK: Gyeongbuk, Gyeongnam; Busan [Hong S.Y. *et al.*, 1982]; **SP**; **MNP**.

Zonal-biogeographical characteristics: Subtropical-lowboreal.

Comments: Data on distribution of this species in the Bering Sea, Alaska, and Canada [Higo *et al.*, 1999] are erroneous; it appears that they refer, in fact, to *Macoma golikovi* Scarlato and Kafanov, 1988 (see comments under *M. golikovi*).

Biology and ecology: Golikov and Scarlato [1967]; Zolotarev [1976]; Evseev [1981]; Scarlato [1981]; Maximovich and Lysenko [1986]; Popov [1992]; Yavnov [2000]; Lutaenko [2003a]; Moshchenko and Belan [2005]; Belan T. and Belan [2006].

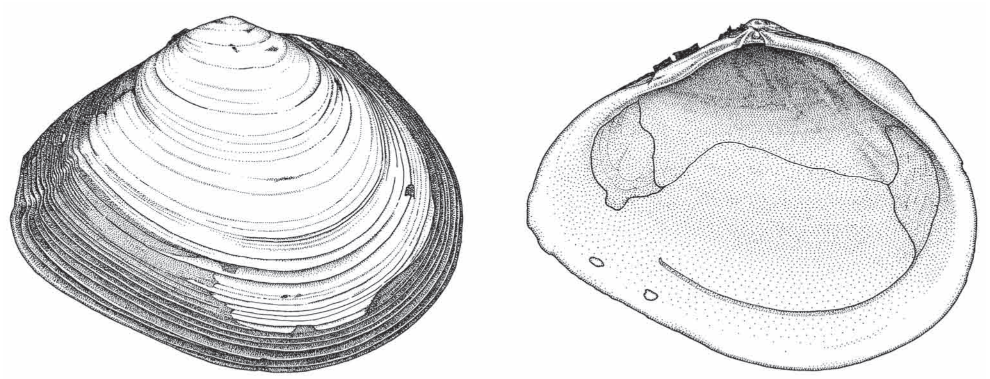

Fig. 24. *Macoma* (*Macoma*) *incongrua* (Martens, 1865): SP, Possjet Bay, Novgorodskaya Bay, depth 3–5 m, shell length 40 mm, ZMFU 9351/Bv-247.

211. *Macoma* (*Macoma*) *loveni* (Jensen, 1905)

Pl. 44, Figs. G–J

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Comments: Kamenev and Nadtochy [1999] suggested that *Abrina sachalinica* Scarlato, 1981 (originally in Semelidae), described from southern Sakhalin, is a synonym of this species, whereas Danilin and Voronkov [2008] did not agree with this.

Biology and ecology: Evseev [1981]; Scarlato [1981]; Kamenev and Nadtochy [1999].

212. *Macoma* (*Macoma*) *lama* Bartsch, 1929

Regional distribution: NK: Gangwon; **SP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: Scarlato [1981] recognized two subspecies: *M. lama lama* and *M. lama meridionalis* Scarlato, 1981, claiming that the former one is distributed mostly in the high-boreal Pacific and North America, and the latter one in the Sea of Japan/East Sea, southern Sea of Okhotsk, and southern Kurile Islands. This was followed by some Russian and Japanese malacologists [e.g., Kafanov, 1991; Amano, 1996; Evseev, 1996; Kantor and Sysoev, 2005]. However, Scarlato [1981] mentioned an overlapping in the distributional ranges of the two subspecies (Sakhalinsky Bay), and we believe that morphological differences between "southern" and "northern" subspecies are minor and do not deserve subspecies rank, as do Coan *et al.* [2000]. The holotype is figured by Higo *et al.* [2001].

Biology and ecology: Scarlato [1981].

213. *Macoma* (*Macoma*) *golikovi* Scarlato et Kafanov, 1988

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.

Comments: This species was originally described as *Macoma orbiculata* Scarlato, 1981 from southern Sakhalin, Sea of Japan/East Sea [Scarlato, 1981], and was then renamed, because of preoccupation, as *M. golikovi* non Kanno, 1958 [Scarlato and Kafanov, 1988]. Later, Kafanov [1999b] clearly showed that the Plio-Pleistocene Western European and Mediterranean *Macoma obliqua* (J. Sowerby, 1817), regarded as living in the north-eastern Pacific [Coan, 1971] and previously erroneously assigned by many authors to the Asian *M. incongrua* [Dunnill and Ellis, 1969; Coan, 1971], is different from *M. golikovi*, a widely distributed temperate species in both the northwestern and north-eastern Pacific. However, the earliest record of this species in the Sea of Japan/East Sea as "*Macoma arnheimi* Dall" by Evseev [1981, pl. 1, figs. 1, 4] was overlooked and was not discussed by Scarlato and Kafanov [1988] and Kafanov [1991; 1999b]. *Macoma inquinata arnheimi* Dall, 1916 is a synonym of *Macoma inquinata* (Deshayes, 1855) [Coan, 1971; Coan et al., 2000] and is not a related species. A synonym of *M. golikovi* is *Macoma lukini* Kamenev, 1990 from the Kurile Islands. *M. golikovi* was recorded from the entrance of Ussuriysky Bay [Evseev and Kiyashko, 1995] and in Nakhodka Bay (SP) as empty shells [Lutaenko, 1999].

Biology and ecology: Scarlato [1981]; Kafanov [1999].

214. *Macoma* (*Macoma*) *moesta* (Deshayes, 1855)

Regional distribution: SK: Gangwon; **SP**; **MNP**.

Zonal-biogeographical characteristics: Widely distributed boreal.

Biology and ecology: Scarlato [1981].

215. *Macoma* (*Macoma*) *nipponica* (Tokunaga, 1906)

Pl. 45, Figs. A–D

Regional distribution: SK: Gangwon, Gyeongbuk; **SP**.

Zonal-biogeographical characteristics: Subtropical.

Comments: The synonymization of this species with *Macoma crassula* (Deshayes, 1855) [Bernard, 1983a; Coan *et al.*, 2000] is not substantiated [Lutaenko, 2003a; Danilin and Voronkov, 2008]. Records of *M. nipponica* in Terpeniya Bay, Sakhalin Island, western Sea of Okhotsk [Volova and Scarlato, 1981] may belong to misidentified *M. crassula.*

Biology and ecology: Lutaenko [2003a; 2004a].

216. *Macoma* (*Macoma*) *scarlatoi* Kafanov et Lutaenko, 1997

Pl. 47, Figs. A–D; Text-fig. 25

Regional distribution: SP; **MNP**.

Zonal-biogeographical characteristics: Widely distributed boreal.

Comments: This species name was proposed as *nom. nov.* for *Macoma orientalis* Scarlato in Golikov and Scarlato, 1967 non *Macoma* (*Cymatoica*) *orientalis* (Dall, 1890) [Kafanov and Lutaenko, 1997b]. Most Japanese researchers do not distinguish this species from *M. calcarea* (see synonymy in Kafanov and Lutaenko [1997b]).

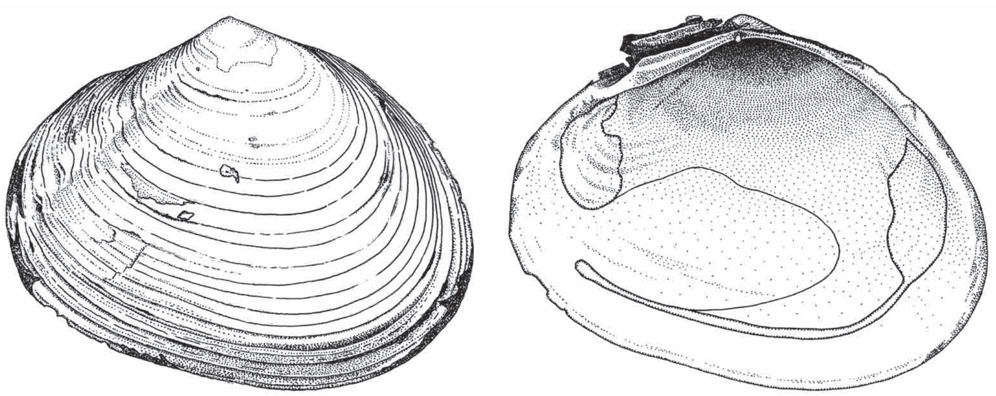

Fig. 25. *Macoma* (*Macoma*) *scarlatoi* Kafanov et Lutaenko, 1997: SP, Possjet Bay, depth 38 m, shell length 54.5 mm, ZMFU 17324/Bv-2383.

However, illustrated Korean records [Kwon *et al.*, 2001; Min D.-K. *et al.*, 2004] undoubtedly belong to the true *M. calcarea.* Records of "*M. orientalis*" from the northern Sea of Okhotsk [Volova and Scarlato, 1991] may be a misidentification. The holotype of *M. orientalis* was figured by Scarlato [1981; two possible paratypes were figured by Lutaenko and Volvenko [2009].

Biology and ecology: Golikov and Scarlato [1967]; Zolotarev [1976]; Popov [1992]; Yavnov [2000]; Lutaenko [2003a]; Belan T. and Belan [2006].

217. *Macoma* (*Macoma*) *tokyoensis* Makiyama, 1927

Pl. 46, Figs. E–H; Text-fig. 26

Regional distribution: SK: Gyeongbuk; Ulsan [Yi *et al.*, 1982]; **SP**.

Zonal-biogeographical characteristics: Subtropical.

Biology and ecology: Yavnov [2000]; Lutaenko [2003a; 2004a]; Moshchenko and Belan [2005]; Belan T. and Belan [2006]; Drozdov *et al.* [2009].

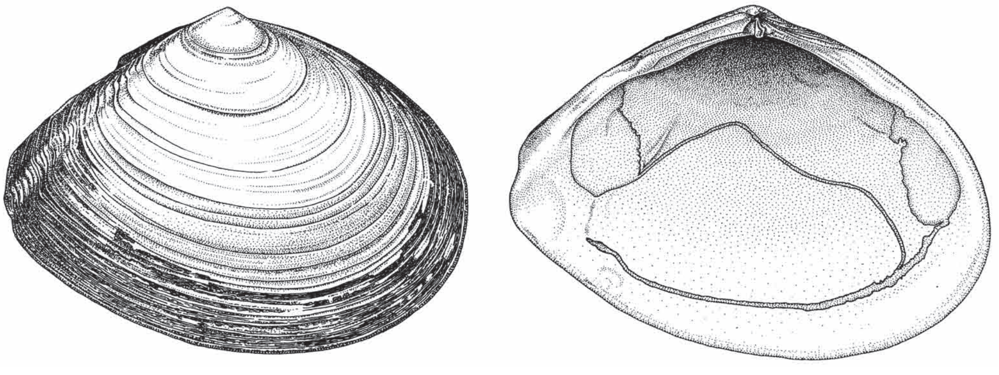

Fig. 26. *Macoma* (*Macoma*) *tokyoensis* Makiyama, 1927: SP, Possjet Bay, entrance to Expeditsii Bay, shell length 45 mm, ZMFU 10126/Bv-563.

218. *Macoma* (*Macoma*) *contabulata* (Deshayes, 1854)
Pl. 47, Figs. E–H; Text-fig. 27

Regional distribution: SK: Gangwon, Gyeongbuk, Busan; **SP**; **MNP**.
Zonal-biogeographical characteristics: Subtropical.
Comments: A synonym of this species is *Macoma sicca* Scarlato et Ivanova in Scarlato, 1981 described from Ussuriysky Bay (SP) [Kafanov and Lutaenko, 1996].

Biology and ecology: Evseev [1981]; Komendantov and Orlova [1990]; Yavnov [2000]; Lutaenko [2004a].

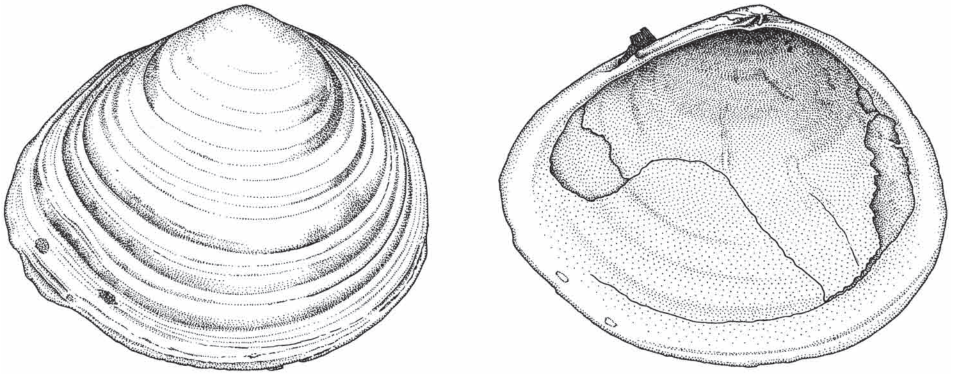

Fig. 27. *Macoma* (*Macoma*) *contabulata* (Deshayes, 1854): SP, Possjet Bay, Gladkaya River estuary, shell length 56.4 mm, ZMFU 10151/Bv-586.

219. *Macoma* (*Macoma*) *praetexta* (Martens, 1865)
Pl. 48, Figs. G, H

Regional distribution: SK: Gyeongbuk, Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

220. *Macoma* (*Macoma*) *coani* Kafanov et Lutaenko, 1999
Pl. 44, Figs. A–D

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: This species was erroneously assigned to *M. praetexta* [Kafanov and Lutaenko, 1996] but then was re-described as new to science [Kafanov and Lutaenko, 1999]. In Japan, it was known as "*M. moesta*" [Tsuchida and Kurozumi, 1995]. Recent records confirm its occurrence in MNP (Dzhigit Bay) [Kolpakov, 2009].

221. *Macoma* (*Macoma*) *middendorffi* Dall,1884
Pl. 43, Figs. A, B

Regional distribution: SK: Gangwon; **NK**: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: An obvious synonym of this species, missed in literature, is *Tellina solmonaeformis* Nomura et Hatai, 1940 [Nomura and Hatai, 1940; as "*T. salmonaeformis*" in caption to plate IV]; type locality – Kyuroku Island in Aomori Prefecture, northeast Honshu, Japan.

Biology and ecology: Zolotarev [1976]; Evseev [1981].

222. *Macoma* (*Macoma*) sp.

Pl. 49, Figs. A, B; Text-fig. 28

Regional distribution: SP; **MNP**.

Comments: This species was cited as "*Macoma brota* Dall, 1916" by Moskaletz [1984] and Lebedev *et al.* [2004] from Peter the Great Bay. Examination of specimens studied by these authors (MIMB) showed that this species of *Macoma* is different from *M. calcarea* in having a shortened shell with a rather displaced beak anteriorly, a short and straight antero-dorsal margin, and a more convex, extended antero-ventral margin. The status of this morph is unclear.

Although *M. brota* was recorded from the southern Kurile Islands and Sakhalin [Habe, 1977a], it has never been cited (except for the above-mentioned references) or illustrated by other authors for this region of the northwestern Pacific. Danilin [2002] recorded *M. brota*, without illustrations, for the western Bering Sea for the first time in Russian waters. We believe that it not as close to *M. calcarea* as many authors mentioned, but instead to *M. scarlatoi* which was noted first by Petrov [1982]; therefore, a portion of the records of "*M. orientalis* Scarlato" in the high-boreal areas of the NW Pacific may belong to *M. brota* [Scarlato, 1981; Volova and Scarlato, 1991; Kafanov, 1991].

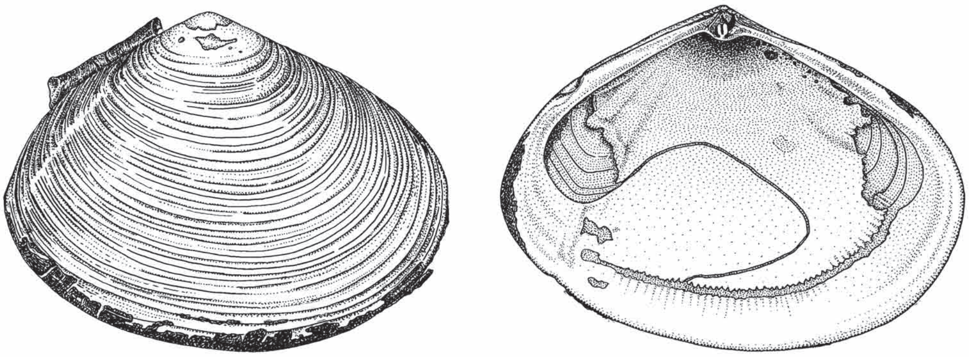

Fig. 28. *Macoma* (*Macoma*) sp.: SP, Peter the Great Bay, western part, depth 62 m, shell length 61 mm, MIMB.

223. *Macoma* (*Macoma*) *torelli* (Jensen, 1905)

Regional distribution: SP; **MNP**.

Zonal-biogeographical characteristics: Widely distributed boreal-arctic.

Biology and ecology: Scarlato [1981].

224. *Macoma* (*Macoma*) *crassula* (Deshayes, 1855)

Regional distribution: SP; **MNP**.

Zonal-biogeographical characteristics: Widely distributed boreal-arctic.

Comments: The relationships of *M. crassula* and *M. torelli* and their geographical distribution in the Sea of Japan/East Sea are in need of further study. Danilin and Voronkov [2008] followed Coan *et al.* [2000] in separating them, whereas other workers recognize either *M. crassula* or *M. torelli* in this region [Scarlato, 1981; Amano, 1996].

225. *Macoma* (*Rexithaerus*) *hokkaidoensis* Amano et Lutaenko in Amano, Lutaenko et Matsubara, 1999

Pl. 44, Figs. E, F

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: This species was previously illustrated as *Macoma sectior* Oyama, 1950 from the Primorye region (Holocene and Recent) [Evseev, 1981; Kafanov and Lutaenko, 1996]. However, specimens from the northwestern Sea of Japan/East Sea, Hokkaido, Kunashir Island (southern Kurile Islands), and Aniva Bay (Sakhalin) have a transverserly elongate shell, obliquely-truncated postero-dorsal margin, less prominent dorsal flange, and shallow pallial sinus, and were described as a new species [Amano *et al.*, 1999]. This species was recorded from both SP and MNP [Evseev, 1981; Amano *et al.*, 1999; Kolpakov, 2008].

226. *Macoma* (*Rexithaerus*) *sectior* (Oyama, 1950)

Pl. 43, Figs. C, D

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam; **NK**: Hamnam.
Zonal-biogeographical characteristics: Subtropical.
Comments: Records from NK may refer to *M. hokkaidoensis.* A paralectotype is figured by Higo *et al.* [2001].

227. *Macoma* (*Heteromacoma*) *irus* (Hanley, 1844)

Pl. 48, Figs. A–F; Text-fig. 29

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam, Ulsan; **NK**: Hamnam; **SP**.
Zonal-biogeographical characteristics: Subtropical.
Comments: Son and Hong [2005] figured this species from Busan under the heading "*M. contabulata*". The lectotype is figured by Higo *et al.* [2001].
Biology and ecology: Zolotarev [1976; 1980; 1989]; Kim I.-H. [2004].

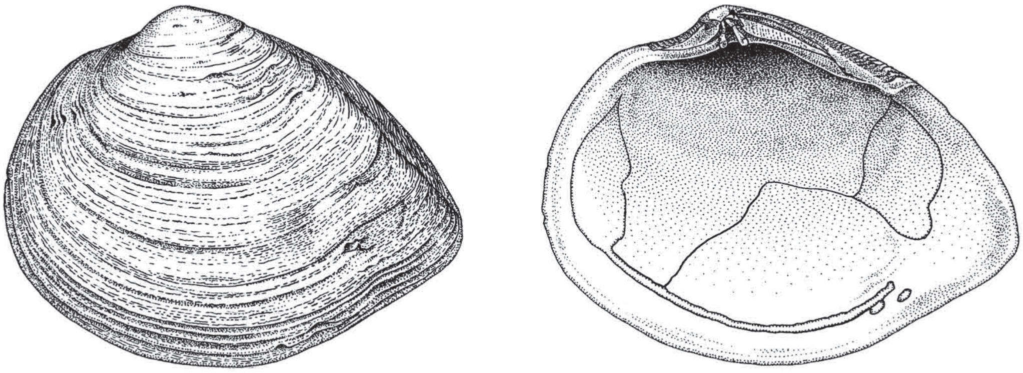

Fig. 29. *Macoma* (*Heteromacoma*) *irus* (Hanley, 1844): SP, Possjet Bay, Aleut Bay, shell length 48.3 mm, ZMFU 16491/Bv-2245.

228. *Pharaonella sieboldii* (Deshayes, 1855)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

229. *Angulus vestalioides* (Yokoyama, 1920)

Regional distribution: SK: Gyeongbuk, Gyeongnam, Busan.
Zonal-biogeographical characteristics: Tropical-subtropical.

230. *Merisca* (*Pistris*) *capsoides* (Lamarck, 1818)
Pl. 49, Figs. G, H

Regional distribution: SK: Gyeongbuk, Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.

231. *Loxoglypta lauta* (Gould, 1850)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: A possible synonym of *Loxoglypta clathrata* (Deshayes, 1835).

232. *Moerella rutila* (Dunker, 1860)[9]

Regional distribution: SK: Gyeongbuk, Busan.
Zonal-biogeographical characteristics: Tropical-subtropical.
Biology and ecology: Kang C.-K. *et al.* [2006]; Kim Y.S. *et al.* [2008].

233. *Moerella jedoensis* (Lischke, 1872)
Pl. 49, Figs. C, D

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.

234. *Moerella iridescens* (Benson, 1842)

Regional distribution: SK: Busan.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: A possible type is figured by Higo *et al.* [2001].

235. *Bathytellina citrocarnea* Kuroda et Habe in Habe, 1958

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

236. *Nitidotellina hokkaidoensis* (Habe, 1961)
Pl. 42, Figs. H, I

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.
Comments: The holotype is figured by Higo *et al.* [2001].

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[9] *Moerella* sp. is additionally recorded from Yeongil Bay (Pl. 49, Figs. E, F).

237. *Nitidotellina minuta* (Lischke, 1872)

Pl. 42, Figs. F, G

Regional distribution: SK: Gangwon, Gyeongbuk, Busan.
Zonal-biogeographical characteristics: Tropical-subtropical.

238. *Nitidotellina pallidula* (Lischke, 1871)

Pl. 42, Figs. J, K

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Tropical-subtropical.

Family **Psammobiidae** Fleming, 1828

239. *Gari* (*Gari*) *anomala* (Deshayes, 1855)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: Willan [1993] suggested that records from Japan and China may belong to misidentified *Gari* (*Gari*) *pallida* (Deshayes, 1855), also a tropical-subtropical species with a distribution range from the western Pacific to the Indian Ocean and Red Sea.

240. *Gari* (*Gobraeus*) *kazusensis* (Yokoyama, 1922)

Pl. 51, Figs. A–D; Text-fig. 30

Regional distribution: SK: Gangwon, Gyeongbuk; **SP**.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: Lutaenko [2009] confirmed the validity of this species, previously synonymized with *Gari* (*Gobraeus*) *californica* (Conrad, 1849) from the eastern Pacific [Bernard, 1983a; Coan, 2000; Coan *et al.*, 2000]. *G. kazusensis* is clearly differentiated from *G. californica* by a more elongated shell shape, broadly rounded anterior end, complete absence of radial color rays on the shell surface, and smaller size.
Biology and ecology: Zolotarev [1976; 1980; 1989].

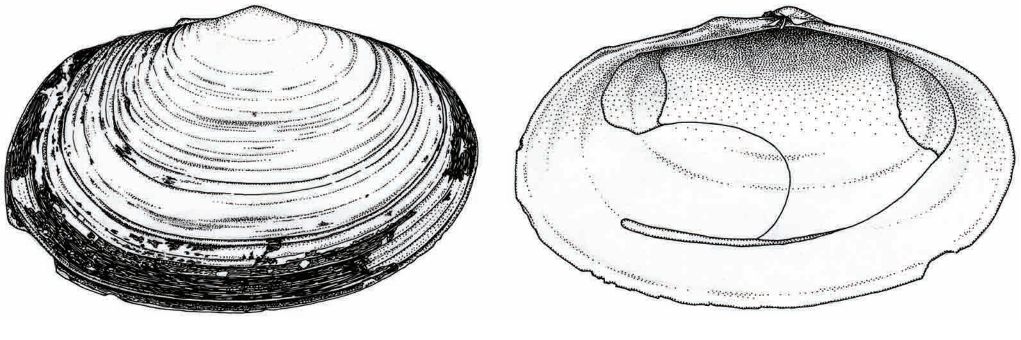

Fig. 30. *Gari* (*Gobraeus*) *kazusensis* (Yokoyama, 1922): SP, Peter the Great Bay, Reineke Island, shell length 52 mm, ZMFU 10857/Bv-1090.

241. *Nuttallia obscurata* (Reeve, 1857)

Pl. 52, Figs. E–H; Text-fig. 31

Regional distribution: SK: Gyeongbuk, Gyeongnam, Busan; **NK**: Hambuk, Hamnam, Gangwon; **SP**; **MNP**.

Zonal-biogeographical characteristics: Subtropical.

Comments: *Psammobia olivacea* Jay, 1857 is a junior synonym of *N. obscurata* [Roth, 1978]. Records of this species from Possjet Bay [Golikov and Scarlato, 1967] were treated as belonging to *Nuttallia japonica* (Reeve, 1857) [Roth, 1978] but *N. japonica* has never been found in Russian waters of the Sea of Japan/East Sea. Specimens figured as *N. olivacea* by Min D.-K. *et al.* [2004, fig. 1491] seem to represent *Nuttallia ezonis* Kuroda and Habe in Habe, 1955. *N. obscurata* was introduced into British Columbia in 1991, and since then has been reported as far south as Alsea Bay, Oregon [Coan *et al.*, 2000].

Biology and ecology: Kozlitina [1976]; Zolotarev [1976; 1980; 1989]; Yaroslavtseva and Fedoseeva [1978]; Evseev [1981]; Yaroslavtseva *et al.* [1981]; Rybakov [1986]; Karpenko [1988]; Berger and Kharazova [1997]; Yavnov [2000]; Kim I.-H. [2004]; Kolpakov and Kolpakov [2005].

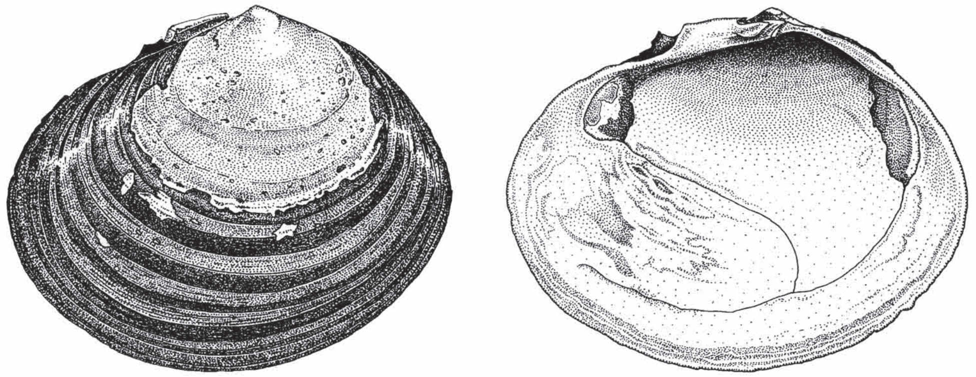

Fig. 31. *Nuttallia obscurata* (Reeve, 1857): MNP, Kievka Bay, shell length 39.3 mm, ZMFU 20657/Bv-3338.

242. *Nuttallia japonica* (Reeve, 1857, ex Deshayes MS)

Regional distribution: SK: Gyeongbuk, Gyeongnam, Busan; ?**NK**.

Zonal-biogeographical characteristics: Subtropical.

Comments: Roth [1978] has shown that this species was misreported by a number of authors as *N. olivacea* (=*N. obscurata*) and, in turn, *N. olivacea* was figured as *N. japonica* in some Japanese works. *N. japonica* is distinguished from the similar *Nuttallia ezonis* Kuroda and Habe in Habe, 1955, by its smaller size and deeper pallial sinus. The distribution of *N. japonica* in Korea is unclear. Specimens figured in Min D.-K. *et al.* [2004, fig. 1490] are atypical in not having a deep pallial sinus and, based on shell shape, may belong to *N. obscurata*. The lectotype is figured by Roth [1978] and Higo *et al.* [2001].

243. *Nuttallia ezonis* Kuroda et Habe in Habe, 1955

Pl. 52, Figs. A–D; Text-fig. 32

Regional distribution: SK: Gangwon; **NK**: Hamnam, Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: The holotype is figured by Higo *et al.* [2001].

Biology and ecology: Zolotarev [1976; 1989]; Evseev [1981]; Rybakov [1986]; Popov [1992]; Yavnov [2000].

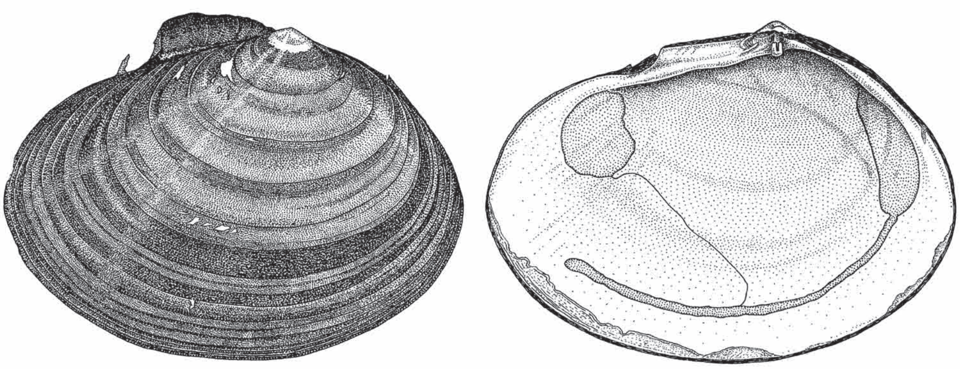

Fig. 32. *Nuttallia ezonis* Kuroda et Habe in Habe, 1955: SP, Possjet Bay, Vityaz Bay, depth 1.5 m, shell length 67.9 mm, ZMFU 27496/Bv-4564.

244. *Nuttallia commoda* (Yokoyama, 1925)

Pl. 51, Figs. E–H

Regional distribution: SK: Gangwon; **NK**: Hamnam, Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: Although Scarlato [1981] recorded this species only in SP and near southern Sakhalin, Evseev [1981] found its shells as far north as Zerkalnaya Bay in MNP. "*Hiatula atrata* (Reeve)" of Lebedev *et al.* [2004] may be a juvenile of this species.

Biology and ecology: Scarlato [1981]; Yavnov [2000].

245. *Soletellina atrata* Deshayes in Reeve, 1857

Pl. 53, Figs. A, B

Regional distribution: SK: Gyeongbuk, Busan.
Comments: A syntype is figured by Higo *et al.* [2001].
Zonal-biogeographical characteristics: Tropical-subtropical.

246. *Soletellina boeddinghausi* Lischke, 1870

Regional distribution: SK: Gyeongnam, Busan.
Comments: Two syntypes are figured by Higo *et al.* [2001].
Zonal-biogeographical characteristics: Subtropical.

Family **Semelidae** Stoliczka, 1870

247. *Theora* (*Endopleura*) *lubrica* A.A. Gould, 1861

Pl. 53, Figs. C–F

Regional distribution: SK: Gyeongbuk; Busan; Ulsan; **SP**; **MNP**.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: "*Theora fragilis* (A. Adams, 1855)", mentioned for both NW Pacific and NE Pacific, is an unrelated species of *Theora* [Coan *et al*., 2000]. The lectotype is figured by Higo *et al.* [2001].

Biology and ecology: Golikov and Scarlato [1967]; Evseev [1981]; Lim H.-S. *et al.* [1995]; Lim H.-S. and Hong [1997]; Lutaenko [2003a]; Lutaenko *et al.* [2003]; Lee H.G. *et al.* [2005]; Moshchenko and Belan [2005]; Belan T. and Belan [2006]; Kim Y.S. *et al.* [2008].

248. *Abra maxima* (Sowerby III, 1894)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.

Family **Solecurtidae** d'Orbigny, 1846

249. *Solecurtus divaricatus* (Lischke, 1869)

Regional distribution: SK: Gyeongnam, Busan.
Zonal-biogeographical characteristics: Subtropical.
Comments: The holotype is figured by Higo *et al.* [2001].

Biology and ecology: Mok *et al.* [2010].

250. *Azorinus abbreviatus* (Gould, 1861)

Regional distribution: SK: Gyeongnam; Ulsan [Yi *et al.*, 1982].
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: This species was cited as *Azorinus chamasolen* Da Costa, 1778 [Min D.-K. *et al.*, 2004, fig. 1495] and as *A. abbreviatus* [Kwon *et al.*, 2001, fig. 1063; the same specimen is figured in both books]. *Solen chamasolen* da Costa, 1778 is a European species. Valentich-Scott [Scott, 1994] stated that the type of *Solecurtus abbreviatus* Gould, 1861 was not found; the type locality is Hong Kong.

Superfamily **UNGULINOIDEA** Gray, 1854

Family **Ungulinidae** Gray, 1854

251. *Felaniella usta* (Gould, 1861)

Pl. 24, Figs. E–H; Text-fig. 33

Regional distribution: SK: Gangwon, Gyeongbuk; Ulsan; **NK**: Hamnam, Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: If the record of this species for Hong Kong [Valentich-Scott, 2003] is correct, *F. usta* can be regarded as tropical-lowboreal which is an unusual distribution. The holotype is figured by Johnson [1964] and Higo *et al.* [2001].

Biology and ecology: Zolotarev [1976; 1989]; Evseev [1981]; Yavnov [2000].

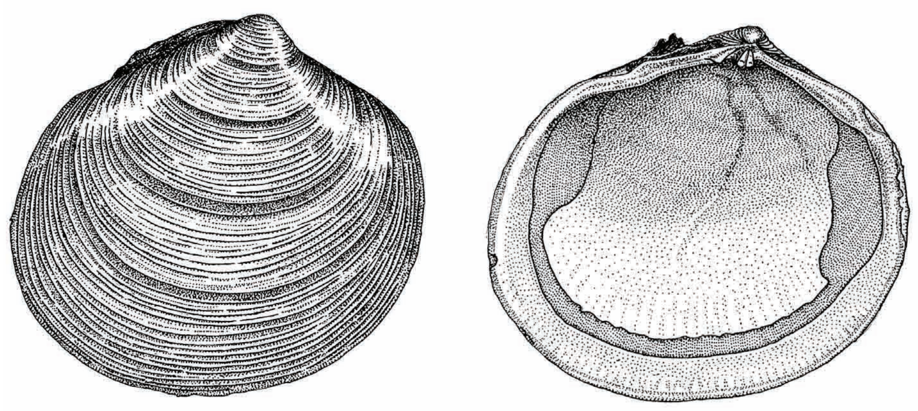

Fig. 33. *Felaniella usta* (Gould, 1861): SP, Ussuriysky Bay, Russky Island, Karpinskogo Bay, shell length 27.5 mm, ZMFU 31874/Bv-5012.

252. *Felaniella sowerbyi* Kuroda et Habe, 1951

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: Valentich-Scott [Scott, 1994; Valentich-Scott, 2003] assigned this species to the genus *Diplodonta* Bronn, 1831.

253. *Felaniella ohtai* Kase et Miyauchi in Kase, Miyauchi et Amano, 1996

Pl. 24, Figs. I, J; Text-fig. 34

Regional distribution: SK: Gangwon; **SP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: *Mesolinga soliditesta* Okutani and Hashimoto, 1997 (Lucinidae), described from a chemosynthetic seep community at the mouth of Suruga Bay, Pacific coast of Japan (depth 363 m) [Okutani and Hashimoto, 1997; Sasaki *et al.*, 2005], was erroneously recorded by Min D.-K. *et al.* [2004, fig. 1354] from Korea, but the specimen figured belongs instead to *F. ohtai*. In a previous book by Korean authors [Kwon *et al.*, 2001], the same specimen is figured as *Cycladicama nomurai* Habe, 1960 [l.c., p. 241, fig. 964]. *F. ohtai* was originally described from Hokkaido [Kase *et al.*, 1996] but was later found in Nakhodka Bay, SP [Lutaenko, 2005b].

254. *Diplodonta semiasperoides* Nomura, 1932

Pl. 25, Figs. A–D; Text-fig. 35

Regional distribution: SK: Gangwon, Gyeongnam; **SP**; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: Some authors (e.g., Higo *et al.* [1999]) assign this species to the genus *Cycladicama* Valenciennes in Rousseau, 1854.
Biology and ecology: Zolotarev [1976]; Evseev [1981].

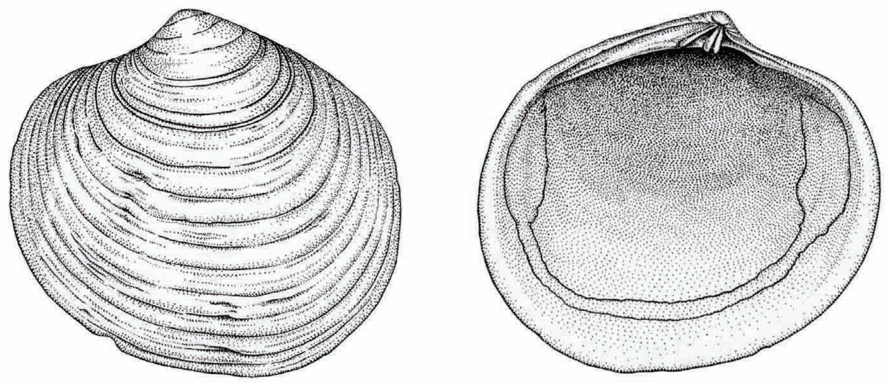

Fig. 34. *Felaniella ohtai* Kase et Miyauchi in Kase, Miyauchi et Amano, 1996: SP, Nakhodka Bay, shell length 31.2 mm, ZMFU 11272/Bv-1332.

255. *Diplodonta gouldi* Yokoyama, 1920

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical-lowboreal.

256. *Cycladicama cumingii* (Hanley, 1844)

Pl. 24, Figs. I, J

Regional distribution: SK: Gyeongbuk, Gyeongnam; Ulsan [Yi *et al.*, 1982].
Zonal-biogeographical characteristics: Tropical-subtropical.

257. *Cycladicama lunaris* (Yokoyama, 1927)

Regional distribution: SK: Gyeongbuk, Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

258. *Cycladicama nomurai* (Habe, 1960)

Regional distribution: SK: Gangwon.
Zonal-biogeographical characteristics: Subtropical.

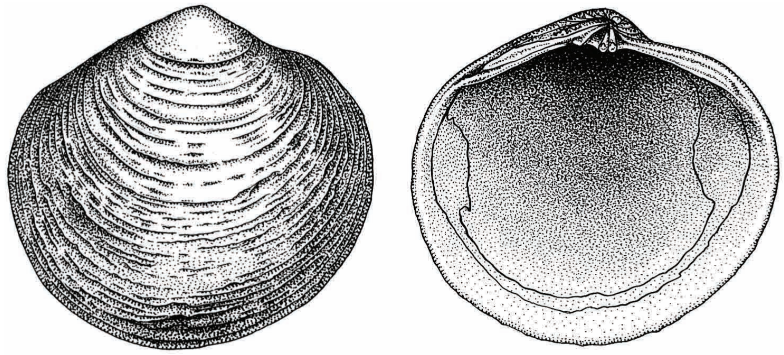

Fig. 35. *Diplodonta semiasperoides* Nomura, 1932: SP, Possjet Bay, Kitovy Bay, shell length 22.4 mm, ZMFU 15827/Bv-2057.

259. *Cycladicama coreensis* (Adams et Reeve, 1850)

Regional distribution: SK.
Zonal-biogeographical characteristics: Subtropical.
Comments: Originally described from the "Corean Archipelago" [Adams and Reeve, 1850; as *Cyrenoida coreensis*, p. 80, pl. 24, fig. 14], this species was not listed in the Korean literature [Lee and Min, 2002]; however, it was recognized in the Japanese fauna [Habe, 1977a] and reported from Korea by Higo *et al*. [1999]. Taking into account that the material collected during the voyage of the *Samarang* comes from an area in Korea between Quelpart (Jeju Island) and 34º40′ N [Belcher, 1848], this species can be found on the continental coast of the Sea of Japan/East Sea.

260. *Phlyctiderma japonicum* (Pilsbry, 1895)
Pl. 24, Figs. C, D

Regional distribution: SK: Gyeongbuk, Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.
Comments: A syntype is figured by Higo *et al.* [2001].

Subfamily **VENEROIDEA** Rafinesque, 1815

Family **Veneridae** Rafinesque, 1815

261. *Venus* (*Ventricoloidea*) *cassinaeformis* (Yokoyama, 1926)

Regional distribution: SK: Gangwon, Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.

262. *Antigona lamellaris* Schumacher, 1817
Pl. 36, Figs. A–D

Regional distribution: SK: Busan.
Zonal-biogeographical characteristics: Tropical-subtropical.

263. *Timoclea* (*Glycydonta*) *marica* (L., 1758)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.

264. *Pitar* (*Pitarina*) *noguchii* Habe, 1958

Regional distribution: SK: Gyeongnam [Lee and Min, 2002].
Zonal-biogeographical characteristics: Tropical-subtropical.

265. *Callista* (*Callista*) *chinensis* (Holten, 1803)
Pl. 41, Figs. E, F

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Tropical-subtropical.

266. *Callista* (*Ezocallista*) *brevisiphonata* (Carpenter, 1864)
Pl. 41, Figs. A–D

Regional distribution: SK: Gangwon, Gyeongbuk; **NK**: Hamnam; **SP**; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: *Callista trigonoovata* Scarlato in Volova et Scarlato, 1980, described from Peter the Great Bay (SP), is a synonym of this species [Kafanov and Lutaenko, 1998b]. A possible syntype of *C. brevisiphonata* is figured by Higo *et al.* [2001].

Biology and ecology: Golikov and Scarlato [1967]; Leibson and Movchan [1975]; Zolotarev [1976; 1980; 1989]; Zolotarev and Ignatiev [1977]; Vasilieva [1978]; Evseev [1981]; Scarlato [1981]; Drozdov and Kasyanov [1985]; Popov [1986; 1992]; Selin and Selina [1988]; Malakhov and Medvedeva [1991]; Yavnov [2000]; Evseev *et al.* [2001]; Sokolenko and Sedova [2005]; Semenikhina *et al.* [2006]; Sokolenko *et al.* [2006]; Tokmakova *et al.* [2006]; Bobovsky [2008].

267. *Saxidomus purpurata* (Sowerby II, 1852)
Pl. 37, Figs. A–D

Regional distribution: SK: Gyeongnam, “all parts of the country” [Min D.-K. *et al.*, 2004]; **SP**.
Zonal-biogeographical characteristics: Subtropical.

Biology and ecology: Golikov and Scarlato [1967]; Kim A.Y. [1971]; Zolotarev [1976]; Vasilieva [1978]; Evseev [1981]; Scarlato [1981]; Popov [1986; 1992]; Chung E.-Y. and Kim [1994]; Yavnov [2000]; Kim W.-S. *et al.* [2003]; Kim Y.H. *et al.* [2003; 2006; 2007]; Park K.-I. *et al.* [2003]; Jung *et al.* [2004a; b]; Lee C.-H. *et al.* [2005]; Semenikhina *et al.* [2006]; Tokmakova *et al.* [2006]; Yoon H.S. *et al.* [2007]; Ju *et al.* [2010; 2011]; Kim Y.S. *et al.* [2010]; Mok *et al.* [2010]; Kim J.H. and Kim [2011].

268. *Dosinia* (*Phacosoma*) *japonica* (Reeve, 1850)
Pl. 39, Figs. E–H; Pl. 40, Figs. A, B; Text-fig. 36

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam, Busan; **NK:** Hambuk; **SP**.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: The viewpoint of Kafanov and Lutaenko [1997a] about synonymization of *Dosinia tumida* (Gray, 1838) and *D. japonica* is not substantiated. A syntype of *D. japonica* is figured by Higo *et al.* [2001].

Biology and ecology: Golikov and Scarlato [1967]; Zolotarev [1976; 1980; 1989]; Evseev [1981]; Scarlato [1981]; Yavnov [2000]; Kim I.-H. [2002]; Semenikhina *et al.* [2006]; Tokmakova *et al.* [2006]; Mok *et al.* [2010]; Kim J.H. *et al.* [2011].

269. *Dosinia* (*Phacosoma*) *troscheli* (Lischke, 1873)
Pl. 40, Figs. C, D

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: The holotype is figured by Higo *et al.* [2001].

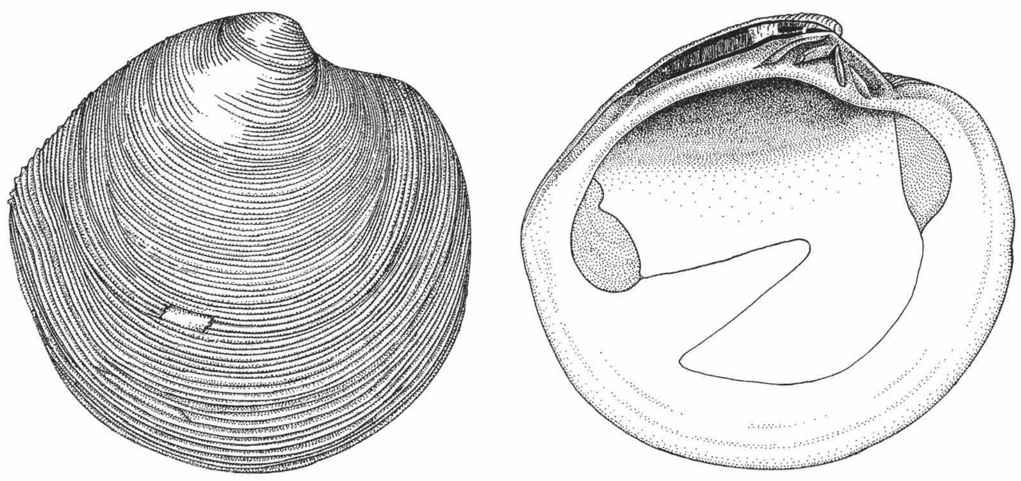

Fig. 36. *Dosinia* (*Phacosoma*) *japonica* (Reeve, 1850): SP, Possjet Bay, Vityaz Bay, depth 1.5 m, shell length 56.3 mm, ZMFU 27499/Bv-4567.

270. *Dosinia* (*Dosinella*) *penicillata* (Reeve, 1850)

Pl. 39, Figs. A–D; Text-fig. 37

Regional distribution: SK: Gyeonbuk; **SP**.

Zonal-biogeographical characteristics: Tropical-subtropical.

Comments: This species was long known in the Russian literature as *Dosinia angulosa* (Philippi, 1847) [Golikov and Scarlato, 1967; Scarlato, 1981; Kafanov, 1991]. Kafanov and Lutaenko [1997a] clearly showed that records from Peter the Great Bay belong instead to *D. penicillata* and they illustrated syntypes of *Artemis penicillata* Reeve, 1850. The synonymizing of *Artemis corrugata* Reeve, 1850 and *A. penicillata* [Bernard *et al.*, 1993; Higo *et al.*, 1999] is not substantiated; types of the former species [Fischer-Piette and Delmas, 1967, pl. 13, figs. 1−3] are dissimilar to that of *A. penicillata* [Kafanov and Lutaenko, 1997a, fig. 1]. *Dosinia trailli* A. Adams, 1855 might be a synonym of *D. penicillata* (see possible types: Fischer-Piette and Delmas [1967, pl. 13, figs. 4−12]). Records of "*Dosinella corrugata* (Reeve, 1850)" from Korea [Min D.-K. *et al.*, 2004] clearly represent true *D. penicillata.*

Biology and ecology: Golikov and Scarlato [1967]; Zolotarev [1980; 1989]; Scarlato [1981]; Yavnov [2000]; Lutaenko [2003a; 2004a]; Moshchenko and Belan [2005]; Belan T. and Belan [2006]; Rakov and Leskova [2008].

271. *Ruditapes philippinarum* (A. Adams et Reeve, 1850)

Pl. 35, Figs. E–F

Regional distribution: SK: Gyeongbuk, Busan, "all parts of the country" [Min D.-K. *et al*, 2004]; **NK**: Hamnam; **SP**; **MNP**.

Zonal-biogeographical characteristics: Subtropical-lowboreal.

Comments: The holotype is figured by Higo *et al.* [2001].

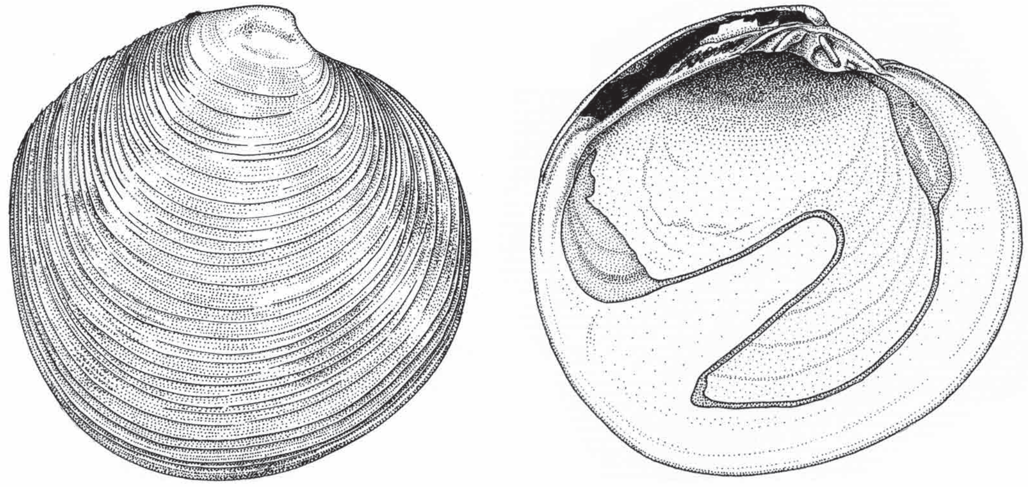

Fig. 37. *Dosinia* (*Dosinella*) *penicillata* (Reeve, 1850): SP, Amursky Bay, depth 2.5 m, shell length 46.9 mm, ZMFU 32606/Bv-5025.

Biology and ecology: Choe S. [1965]; Golikov and Scarlato [1967]; Chun *et al.* [1969]; Lee C. *et al.* [1969]; Kozlitina [1976]; Zolotarev [1976; 1980; 1989]; Yaroslavtseva and Fedoseeva [1978]; Evseev [1981]; Scarlato [1981]; Yaroslavtseva *et al.* [1981]; Berger *et al.* [1982]; Rybakov [1983a; b; 1986]; Popov [1986]; Selin *et al.* [1986]; Kim S.Y. and Lee [1988]; Ponurovsky and Selin [1988]; Rakov [1988]; Kulikova and Kolotukhina [1989]; Silina and Popov [1989]; Ponurovsky and Kolotukhina [1990]; Ponurovsky and Yakovlev [1992]; Popov [1992]; Kalashnikova and Aizdaicher [1993]; Ponurovsky [1993; 2000; 2007; 2010]; Won and Hur [1993]; Zhang *et al.* [1994]; Jo *et al.* [1995]; Lee Y.-H. *et al.* [1996]; Berger and Kharazova [1997]; Choi K.-S. and Park [1997]; Korn and Kulikova [1997]; Selin [1999b; c; d; 2005]; Shin H.C. and Shin [1999a; b]; Choi Y.-S. *et al.* [2000]; Kang K.H. *et al.* [2000a; 2005]; Shin Y.-K. *et al.* [2000; 2001]; Yavnov [2000]; Evseev *et al.* [2001]; Lee M.-K. *et al.* [2001]; Park K.-I. and Choi [2001]; Chung E.-Y. *et al.* [2002]; Jung *et al.* [2004a; b]; Kang D.-H. *et al.* [2004]; Kim I.-H. [2004]; Kim J.J. *et al.* [2004]; Min K.-S. *et al.* [2004]; Choi K.-S. *et al.* [2005]; Hur *et al.* [2005]; Moshchenko and Belan [2005]; Kim C.W. *et al.* [2006]; Park K.-I. *et al.* [2006a; c]; Semenikhina *et al.* [2006]; Cho and Jeong [2007]; Kang C.-K. *et al.* [2007]; Yoon H.S. *et al.* [2007; 2011]; Cho S.-M. *et al.* [2008]; Rakov and Leskova [2008]; Vargas *et al.* [2008]; Back *et al.* [2009]; Jang *et al.* [2009]; Silina [2009; 2010; 2011]; Bang *et al.* [2010]; Lee J.S., Lee Y.G. *et al.* [2010]; Mok *et al.* [2010]; Choi Y.-M. *et al.* [2011].

272. *Ruditapes bruguieri* (Hanley, 1845)

Regional distribution: SK: Gyeongbuk, Busan.

Zonal-biogeographical characteristics: Tropical-subtropical.

273. *Paphia* (*Paphia*) *euglypta* (Philippi, 1847)

Pl. 34, Figs. E, F

Regional distribution: SK: Gyeongnam, Busan.

Zonal-biogeographical characteristics: Subtropical.

Biology and ecology: Mok *et al.* [2010].

274. *Paphia* (*Paphia*) *schnelliana* (Dunker, 1865)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

275. *Paphia* (*Paphia*) *vernicosa* (Gould, 1861)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.
Comments: The lectotype is figured by Johnson [1964].

276. *Paphia* (*Neotapes*) *undulata* (Born, 1778)

Regional distribution: SK: Busan; Ulsan [Yi *et al.*, 1982].
Zonal-biogeographical characteristics: Tropical-subtropical.
Biology and ecology: Kim Y.H. *et al.* [2001]; Kim Y.S. *et al.* [2008].

277. *Liocyma fluctuosum* (A.A. Gould, 1841)

Pl. 40, Figs. E–H; Text-fig. 38

Regional distribution: SK: Gangwon; **NK**: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Comments: Kafanov [1999a] stated that *Liocyma hokkaidoensis* Habe, 1951, *Liocyma aniwana* Dall, 1907, and *Liocyma viridis* Dall, 1871, recognized earlier in Russian Far Eastern seas [Savizky, 1980], are synonyms of this species. *Liocyma beckii* Dall, 1870, mentioned for Aomori Prefecture (northern Honshu), Kurile Islands, and Okhotsk and Bering seas by Higo *et al.* [1999] without any evidence, is also a synonym of *L. fluctuosum* [Coan *et al.*, 2000].
Biology and ecology: Klimova [1975]; Evseev [1981]; Yavnov [2000]; Lutaenko [2003a]; Rakov and Leskova [2008].

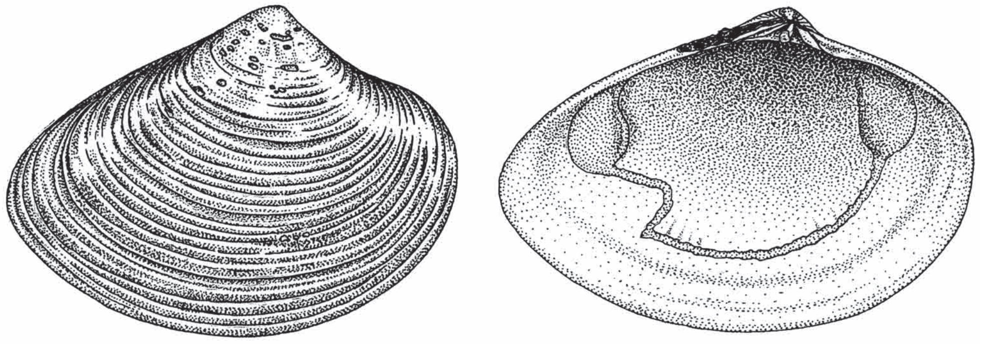

Fig. 38. *Liocyma fluctuosum* (A.A. Gould, 1841): SP, Peter the Great Bay, Cape Bryusa, depth 30 m, shell length 25.5 mm, ZMFU 31878/Bv-5016.

278. *Mercenaria stimpsoni* (Gould, 1861)

Pl. 36, Figs. E–H

Regional distribution: SK: Gangwon, Gyeongbuk; **NK**: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: The holotype is figured by Johnson [1964].

Biology and ecology: Golikov and Scarlato [1967]; Biryulina [1975]; Leibson and Movchan [1975]; Kasyanov *et al.* [1976; 1980]; Zolotarev [1976; 1980; 1989]; Vasilieva [1978]; Evseev [1981]; Scarlato [1981]; Tarasov *et al.* [1982]; Drozdov and Kasyanov [1985]; Popov [1986; 1992]; Radashevsky [1993]; Selin [1995; 1999c]; Khim *et al.* [1998]; Yavnov [2000]; Kolpakov and Kolpakov [2004]; Sokolenko and Sedova [2005]; Tyurin and Drozdov [2005b]; Semenikhina *et al.* [2006]; Sokolenko *et al.* [2006]; Tokmakova *et al.* [2006]; Sedova *et al.* [2007]; Bobovsky [2008].

279. *Protothaca* (*Protothaca*) *euglypta* (Sowerby III, 1914)

Pl. 38, Figs. A–D

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam; **SP**; **MNP**.
Zonal-biogeographical characteristics: Subtropical.

Biology and ecology: Golikov and Scarlato [1967]; Zolotarev [1976; 1980; 1989]; Evseev [1981]; Scarlato [1981]; Popov [1986; 1992]; Yavnov [2000]; Evseev *et al.* [2001]; Semenikhina *et al.* [2006]; Selin [2008].

280. *Protothaca* (*Novathaca*) *jedoensis* (Lischke, 1874)

Pl. 38, Figs. E–H

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam, Busan; **NK**: Hamnam, Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Subtropical.
Comments: "*Callithaca staminea* (Conrad, 1837)" recorded by Lee and Min [2002, fig. 328] and Min D.-K. *et al.* [2004, fig. 1516] for Gangwon Province in SK is an uncolored variety of *P. jedoensis*. *Protothaca* (*Protothaca*) *staminea* (Conrad, 1837) does not inhabit the Sea of Japan/East Sea and is known in the western Pacific, north of Hokkaido, throughout the Kurile Islands to Commander Islands and eastern Kamchatka [Scarlato, 1981; Coan *et al*., 2000]. The holotype of *P. jedoensis* is figured by Higo *et al.* [2001].

Biology and ecology: Golikov and Scarlato [1967]; Zolotarev [1976; 1980; 1989]; Scarlato [1981]; Popov [1986; 1992]; Kim J. *et al.* [2002]; Jung *et al.* [2004a; b]; Kim I.-H. [2004]; Yoon H.S. *et al.* [2005; 2007]; Park K.-I. *et al.* [2006b]; Semenikhina *et al.* [2006]; Yoon H.S. and Choi [2006]; Park G.-S. and Yoon [2008].

281. *Protothaca* (*Protocallithaca*) *adamsii* (Reeve, 1863)

Pl. 37, Figs. E–H; Text-fig. 39

Regional distribution: SK: Gangwon, Gyeongbuk; Busan; **NK**; Hamnam; **SP**; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.

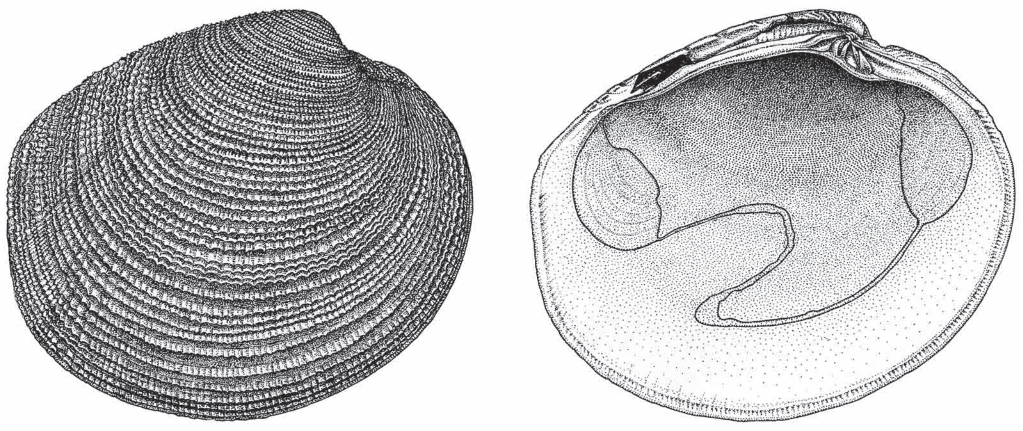

Fig. 39. *Protothaca* (*Protocallithaca*) *adamsii* (Reeve, 1863): SP, Peter the Great Bay, Cape Bryusa, depth 30 m, shell length 64.2 mm, ZMFU 31877/Bv-5015.

Comments: Matsubara [2009] showed that type species of the genus *Callithaca* Dall, 1902 to which this species was assigned by most authors, is quite different from *Protocallithaca* Nomura, 1937 (type species: *Venus adamsii* Reeve, 1863) in having a thinner shell with a much deeper pallial sinus, a smooth inner ventral margin, and weaker cardinal teeth. *P. adamsii* is very similar to *Protothaca* Dall, 1902 in cardinal teeth characteristics and finely crenulated inner ventral margin, but its external shell sculpture resembles *Callithaca*. Thus, it is better to be assigned to the subgenus *Protothaca* (*Protocallithaca*) [Matsubara, 1999]. The correct original spelling is "*adamsii*" instead of "*adamsi*", found in many subsequent works, and is to be conserved according to ICZN Articles 31.1 and 33.4 [Matsubara, 1999]. A possible syntype (NHM) is figured by Higo *et al.* [2001].

Biology and ecology: Zolotarev [1976; 1980; 1989]; Evseev [1981]; Popov [1992]; Yavnov [2000]; Lutaenko [2003a]; Moshchenko and Belan [2005]; Sokolenko and Sedova [2005]; Belan T. and Belan [2006]; Sokolenko *et al.* [2006]; Tokmakova *et al.* [2006].

282. *Gomphina* (*Macridiscus*) *melanaegis* Römer, 1860

Pl. 34, Figs. G–L

Regional distribution: SK: ?Gangwon, Gyeongbuk; **NK**: Gangwon; Hamnam.

Zonal-biogeographical characteristics: Subtropical.

Comments: This species was confused in some works with *Gomphina* (*Macridiscus*) "*aequilatera*" (Sowerby, 1825) [Lutaenko, 2001]. In Korea, Yoo J.-S. [1976] correctly recognized these two species but subsequent workers (e.g., Kwon O.K. *et al.* [1993]; Min D.-K. *et al.* [2004]) misidentified them.

Biology and ecology: Hwang and Hwang [1981]; Lee J.Y. *et al.* [1999]; Kim I.-O. *et al.* [2005]; Kim S.-K. *et al.* [2009]; Mok *et al.* [2010].

283. *Gomphina* (*Macridiscus*) "*aequilatera*" (Sowerby, 1825)

Regional distribution: **SK**: Gangwon, Gyeongbuk, Gyeongnam, Busan; **NK**: Hamnam [Lutaenko and Yakovlev, 1999]; **SP**.

Zonal-biogeographical characteristics: Subtropical.

Comments: Since the 1950s, in Japanese, and some Chinese and Korean literature (see synonymy in Lutaenko [2001]), this species has been known under the name "*Gomphina veneriformis* (Lamarck, 1818)". The type material of *Donax veneriformis* (original name) is deposited in the Muséum National d'Histoire Naturelle (Paris) and undoubtedly belong to *Donax* (Donacidae) [Lutaenko, 2001]. Genetic differences between populations from Samcheok and Wonsan found by J.-R. Kim *et al.* [2006] may be differences between the species *G. melanaegis* and *G. aequilatera*, which are not clearly distinguished in Korean malacological literature.

Biology and ecology: Park C.K. *et al.* [2002]; Park J.J. and Lee [2003]; Park J.J. *et al.* [2003; 2009]; Lutaenko [2004a]; Kim J.-R. *et al.* [2006]; Lee J.S. *et al.* [2007]; Ju *et al.* [2006; 2009]; Shin H.C. *et al.* [2009]; Choi K.-H. *et al.* [2010]; Chung E.-Y. *et al.* [2010]; Park J.J. and Lee [2010]; part of sources may refer, in fact, to *G. melanaegis.*

284. *Cyclosunetta menstrualis* (Menke, 1843)

Pl. 35, Figs. G, H

Regional distribution: **SK**: Busan.

Zonal-biogeographical characteristics: Tropical-subtropical.

285. *Meretrix lusoria* (Röding, 1798)

Regional distribution: **SK**: Busan.

Zonal-biogeographical characteristics: Subtropical.

Comments: Torii *et al.* [2010] showed that the distribution border between *M. lusoria* and *Metretrix petechialis* Lamarck, 1818 is located around the southwestern coasts of Korea (from Ganjin Bay to Baeksu), with existence of hybrids around Ganjin Bay. *M. lusoria* was found in the mid-Holocene deposits of Peter the Great Bay [Evseev, 1981; Rakov and Lutaenko, 1997] but then became extinct in the Late Holocene.

Biology and ecology: Lee C. *et al.* [1969]; Chang S.-D. *et al.* [1976]; Chang S.-D. and Chin [1978]; Pyen *et al.* [1978]; Jung *et al.* [2004a; b]; Kim I.-H. [2004]; Kim J.J. *et al.* [2004]; Hur *et al.* [2005]; Yoon H.S. *et al.* [2007]; Bang *et al.* [2010]; Mok *et al.* [2010]; Torii *et al.* [2010].

286. *Meretrix petechialis* (Lamarck, 1818)

Regional distribution: **SK**: Gyeongnam.

Zonal-biogeographical characteristics: Subtropical.

Comments: See comments for *M. lusoria.*

Biology and ecology: Kim J.J. *et al.* [2004]; Yamakawa *et al.* [2008]; Kim B.H. *et al.* [2009; 2010]; Torii *et al.* [2010]; Kim J.H. and Kim [2011]; Park Y.-J. and Kim [2011].

287. *Meretrix lamarckii* Gray, 1853

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: A possible syntype (NHM) is figured by Higo *et al.* [2001].

288. *Irus* (*Irus*) *irus* (L., 1758)
Pl. 33, Figs. G, H

Regional distribution: SK: Gyeongbuk, Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: Some authors regard *Irus* (*Irus*) *macrophyllus* (Deshayes, 1853) as a synonym of *I. irus* [Higo *et al*., 1999], whereas others [Habe, 1977a; Valentich-Scott, 2003] recogize the former as valid.

289. *Irus* (*Irus*) *mitis* (Deshayes, 1853)
Pl. 33, Figs. I, J

Regional distribution: SK: Gyeongbuk, Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: A possible syntype is figured by Higo *et al.* [2001].

290. *Irus* (*Irus*) *ishibashianus* Kuroda et Habe, 1952
Pl. 34, Figs. A–D

Regional distribution: SK: Gyeongbuk, Gyeongnam.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: In Russian waters of the Sea of Japan/East Sea, this species was found only at Moneron Island, near southwestern Sakhalin [Kafanov and Lutaenko, 1994].

291. *Cyclina sinensis* (Gmelin, 1791)

Regional distribution: SK: Gyeongbuk, Gyeongnam; Busan.
Zonal-biogeographical characteristics: Subtropical.

Biology and ecology: Lee C. *et al.* [1969]; Chang S.-D. and Chin [1978]; Jung H.T. *et al.* [2004a]; Kim I.-H. [2004]; Hur *et al.* [2005]; Kim C.W. *et al.* [2006]; Chung E.-Y. *et al.* [2007b]; Yoon H.S. *et al*. [2007].

292. *Turtonia minuta* (Fabricius, 1780)[10]
Pl. 42, Fig. A

Regional distribution: SK: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Circumboreal.

Biology and ecology: Golikov and Scarlato [1967]; Matveyeva [1976]; Evseev [1981]; Scarlato [1967]; Tokmakova *et al.* [2006].

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[10] This species was regarded in many works as belonging to the family Turtoniidae Clark, 1855. However, in the modern classification by Bieler *et al.* [2010], the latter is a subfamily within Veneridae.

293. *Petricola lapicida* (Gmelin, 1791)[11]

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Tropical-subtropical.

294. *Claudiconcha japonica* (Dunker, 1882)

Regional distribution: SK: Gyeongnam, Busan.
Zonal-biogeographical characteristics: Tropical-subtropical.

295. *Petricolirus aequistriatus* (Sowerby II, 1874)
Pl. 41, Figs. G, H

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.

296. *Pseudoirus mirabilis* Deshayes, 1853

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

Superfamily **MYOIDEA** Lamarck, 1809

Family **Myidae** Lamarck, 1809

297. *Mya* (*Mya*) *truncata* L., 1758
Pl. 57, Figs. E, F; Pl. 58, Figs. A–D; Text-fig. 40

Regional distribution: SK: Busan; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Comments: *Mya eideri* Petersen, 1999, described from western Greenland, is similar to *M. truncata* and has also been reported from the Pacific Ocean (Kodiak Island, Alaska) [Petersen, 1999].
Biology and ecology: Rybakov [1983a]; Kulikova and Kolotukhina [1989]; Yavnov [2000].

298. *Mya* (*Mya*) *uzenensis* Nomura et Zinbo, 1937
Pl. 58, Figs. E–H; Text-fig. 41

Regional distribution: NK: Hamnam; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: This species was long known as "*Mya priapus* Tilesius, 1822" which appeared to be a *Panomya* (Hiatellidae) [Bernard, 1979]. Bernard [1979] showed differences between *Mya pseudoarenaria* Schlesch, 1931 and *M. uzenensis*

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[11] *Petricola* Lamarck, 1801, *Claudiconcha* Fischer, 1887, *Petricolirus* Habe, 1951, and *Pseudoirus* Habe, 1951, among others, were regarded as members of the family Petricolidae d'Orbigny, 1840. In the modern classification [Bieler *et al.,* 2010], the latter is a subfamily within Veneridae. Molecular data show that most of the subfamilies and genera of Veneridae are paraphyletic clades [Chen *et al.,* 2011].

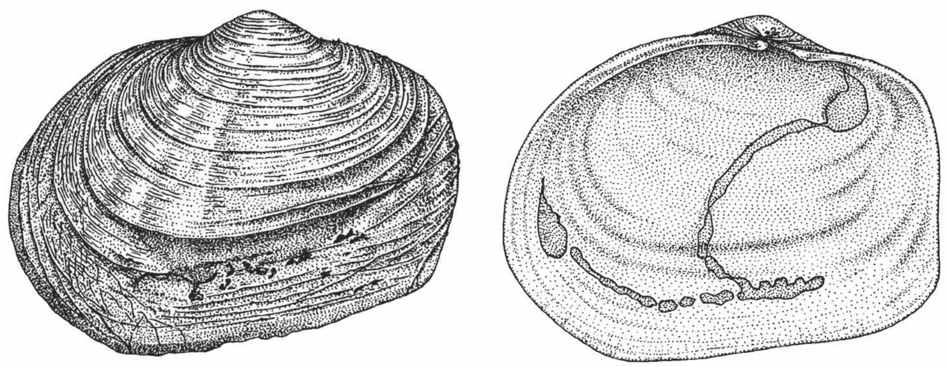

Fig. 40. *Mya* (*Mya*) *truncata* L., 1758: SP, Peter the Great Bay, Cape Bryusa, depth 30 m, shell length 26.6 mm, ZMFU 31879/Bv-5017.

(a Miocene fossil from Japan) in the shape of the pallial sinus and details of the chondrophore, with a circumarctic distribution for the former, the entrance of the Bering Sea being the southernmost point. *M. uzenensis* is known from the southern portion of the Chukchi Sea and throughout the Bering Sea, and south to Hokkaido and the northern Sea of Japan/East Sea [Bernard, 1979]. Therefore, Scarlato's [1981] records of *M. pseudoarenaria* from the Sea of Okhotsk (Sakhalin, Shantarskiye Islands, western Kamchatka, and Shikotan Island, Kurile Islands) may represent *M. uzenensis*. Records of *M. pseudoarenaria*, without illustrations, for SP [Moskaletz, 1984] are difficult to interpret. Coan *et al.* [2000] synonymized *M. uzenensis* and *M. pseudoarenaria*, being convinced that a single Recent species is present in the Pacific Ocean. On the other hand, Petersen [1999] described *Mya neoovata* Petersen, 1999 from south-west Greenland, found also in Alaska at Point Barrow, which is similar to *M. pseudoarenaria*. All this taxonomic confusion may be resolved with molecular studies.

Biology and ecology: Zolotarev [1976]; Evseev [1981]; Ponurovsky and Kolotukhina [2000]; Lutaenko [2003a].

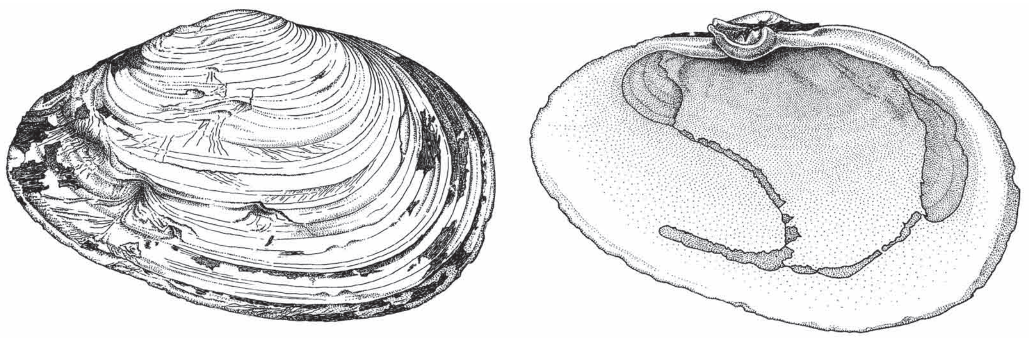

Fig. 41. *Mya* (*Mya*) *uzenensis* Nomura et Zinbo, 1937: SP, Peter the Great Bay, Boysmana Bay, shell length 72.5 mm, ZMFU 10073/Bv-518.

299. *Mya* (*Arenomya*) *japonica* Jay, 1857

Pl. 59, Figs. A–D; Text-fig. 42

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam, Busan; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: The relationships between Atlantic *Mya arenaria* L., 1758 and Asian *M. japonica* are unclear and much in need of molecular study. It is generally believed that *M. arenaria* s.l. occurred in the eastern Pacific from the Miocene to Pleistocene, when it became extinct, but it persisted in Japan and in the North Atlantic, and then was accidentally introduced to California in 1874 with Atlantic oysters [Bernard, 1979; Coan *et al.*, 2000]. In Japan and Korea, it has long been known as a subspecies, *Mya arenaria oonogai* Makiyama, 1935 [Higo *et al.*, 1999; Min D.-K. *et al.*, 2004], along with the existence of *M. japonica* in Japan [Fujie, 1962; Habe, 1977a; Higo *et al.*, 1999]. A syntype of *M. japonica* is figured by Habe [1977b] and Higo *et al.* [2001].

Biology and ecology: Golikov and Scarlato [1967]; Smirnova [1973]; Leibson and Movchan [1975]; Zolotarev [1976; 1980]; Evseev [1981]; Scarlato [1981]; Berger *et al.* [1982]; Kasyanov *et al.* [1983]; Dzyuba and Maslennikova [1987]; Kulikova and Kolotukhina [1989]; Motavkin *et al.* [1990]; Korn and Kulikova [1997]; Ponurovsky and Kolotukhina [2000]; Yavnov [2000]; Kim J.-H. and Yoo [2001]; Lutaenko [2003a]; Kim I.-H. [2004]; Lim H.-S. and Lee [2004]; Moshchenko and Belan [2005]; Tokmakova *et al.* [2006]; Drozdov *et al.* [2009]; Mok *et al.* [2010].

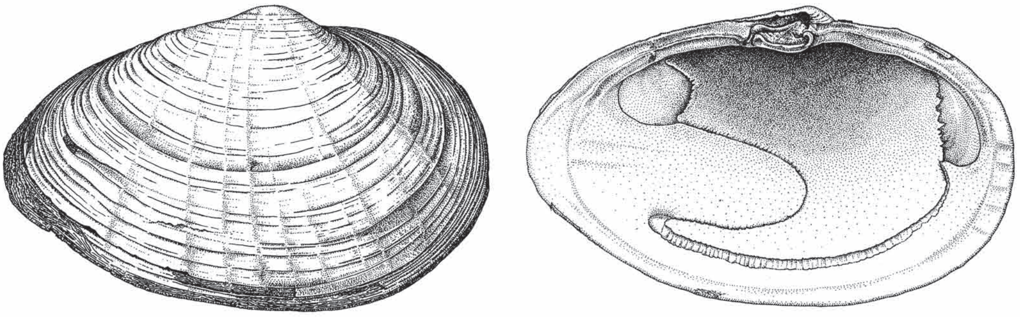

Fig. 42. *Mya* (*Arenomya*) *japonica* Jay, 1857: SP, Possjet Bay, Vityaz Bay, depth 1.5 m, shell length 123.6 mm, ZMFU 27500/Bv-4568.

300. *Cryptomya busoensis* (Yokoyama, 1922)

Pl. 57, Figs. G, H; Text-fig. 43

Regional distribution: SK: Gyeongbuk; **SP**; **MNP**.
Zonal-biogeographical characteristics: Subtropical.
Comments: Although *C. busoensis* was long known only from Possjet, Amursky, Ussuriysky, and Vostok bays in SP [Evseev, 1976; Scarlato, 1981; Lutaenko, 2003a; 2005b], it was recorded from MNP (Dzhigit and Rynda bays) [Lutaenko, 1999; Kolpakov, 2008].

Biology and ecology: Evseev [1981]; Kim I.-H. [2004].

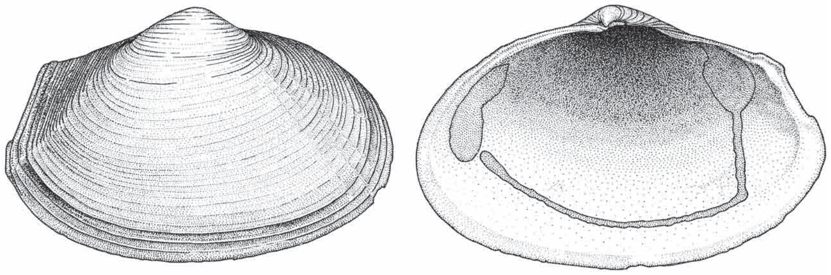

Fig. 43. *Cryptomya busoensis* (Yokoyama, 1922): SK, Yeongil Bay, depth 8.5 m, shell length 10.4 mm, ZMFU 19321/Bv-2814.

301. *Mya* (*Arenomya*) *baxteri* Coan et Scott, 1997

Regional distribution: NK: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: *M. baxteri* was proposed as a new name for *Mya intermedia* Dall, 1898 (non J. Sowerby, 1814) [Coan and Scott, 1997]. In the Russian literature, it was known as *Mya elegans* (Eichwald, 1871) [Scarlato, 1981; Evseev and Kiyashko, 1995; Evseev, 1996], an Alaskan Miocene fossil. Scarlato [l.c.] regarded this species as widely distributed high-boreal, ranging from eastern Sakhalin and western Kamchatka, Sea of Okhotsk, to the Bering Sea and Alaska. Evseev [l.c.] found *M. baxteri* in the early Holocene deposits of East Korean Bay (NK) and in Ussuriysky and Kievka bays (SP and MNP) deeper than 50 m. This species probably became extinct in this area in the Holocene.

302. *Venatomya truncata* (Gould, 1861)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

303. *Paramya recluzi* (A. Adams, 1864)

Pl. 57, Figs. I, J

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.

Family **Corbulidae** Lamarck, 1818

304. *Anisocorbula venusta* (Gould, 1861)

Pl. 59, Fig. I

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam; **SP**; **MNP**.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: The lectotype is figured by Johnson [1964].
Biology and ecology: Zolotarev [1976; 1989]; Evseev [1981].

305. *Potamocorbula amurensis* (Schrenck, 1861)

Pl. 59, Figs. E–H; Text-fig. 44

Regional distribution: SP; **MNP**.

Zonal-biogeographical characteristics: Subtropical-lowboreal.

Comments: Both *Corbula laevis* Hinds, 1843 and *Corbula ustulata* Reeve, 1844 are earlier names of this species complex [Coan, 2002]. The type material of *P. amurensis* was found recently and will be discussed elsewhere.

Biology and ecology: Zolotarev [1980; 1989]; Evseev [1981]; Komendantov and Orlova [1990]; Yavnov [2000]; Lutaenko [2003a]; Moshchenko and Belan [2005]; Tokmakova *et al.* [2006].

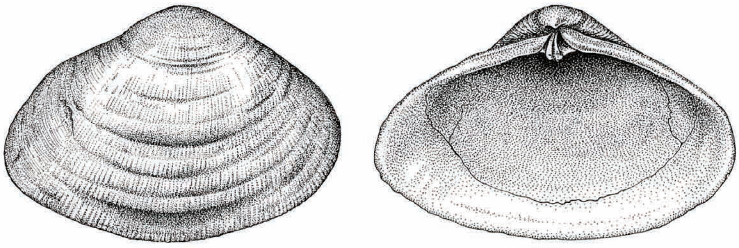

Fig. 44. *Potamocorbula amurensis* (Schrenck, 1861): SP, Ussuriysky Bay, Ambabosa Bay, shell length 19.8 mm, ZMFU 10339/Bv-716.

306. *Potamocorbula ustulata* (Reeve, 1844)

Regional distribution: SK: Gangwon.

Zonal-biogeographical characteristics: Subtropical.

Comments: The status of this species is unclear. Tsuchida and Okamura [1997] discovered that the morphology of *P. ustulata* collected from Shanghai is different from that of *P. amurensis* from northern Japan and *P. laevis*, which has recently been found in western Kyushu [Horikoshi and Okamoto, 1994; Sato and Azuma, 2002]. Therefore all three may be distinct species. Habe [1977a] and Higo *et al.* [1999] synonymized *P. amurensis* and *P. ustulata.* A syntype of *P. ustulata* is figured by Higo *et al.* [2001].

Superfamily **PHOLADOIDEA** Lamarck, 1809

Family **Pholadidae** Lamarck, 1809

307. *Barnea* (*Anchomasa*) *manilensis* (Philippi, 1847)

Pl. 62, Figs. G–J; Text-fig. 45

Regional distribution: SK: Gyeongbuk, Busan; **SP**.

Zonal-biogeographical characteristics: Tropical-subtropical.

Comments: There are two forms of *B. manilensis* in SP, a large, elongated form with a thin shell and a smaller one with a stouter shell [Scarlato, 1981, photo 453; Lutaenko, 2003a, pl., figs. 3, 5]. Scarlato [1981], following Japanese malacologists [Habe, 1955; Yamamoto and Habe, 1959], distinguishes two subspecies: *Barnea manilensis inornata* (Pilsbry, 1895), distributed from Kyushu to Hokkaido, and *B. manilensis manilensis*,

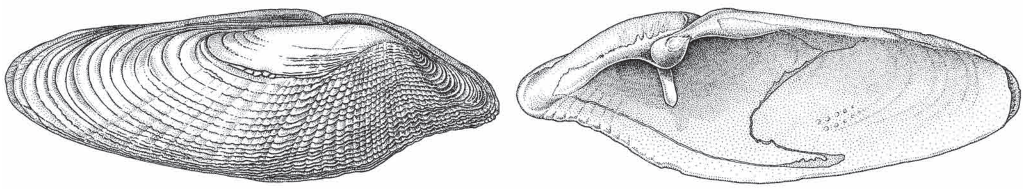

Fig. 45. *Barnea* (*Anchomasa*) *manilensis* (Philippi, 1847): SP, Ussuriysky Bay, Sobol Bay, shell length 28.9 mm, ZMFU 16292/Bv-2183.

from the Philippines to the Ryukyu Islands. According to Yamamoto and Habe [l.c., p. 114], "… all kinds of transitional forms found in many specimens from various localities in Japan, the size of shell decreasing gradually from Ruykyus to Hokkaido". Also, *B. manilensis inornata* differs from *B. manilensis* in having a shell with a less acutely denticulated and more concave frontal margin [Habe, 1955]. In other publications, *B. manilensis inornata* is synonymized with the nominative species [Taki and Habe, 1945; Habe, 1977a; Higo *et al.*, 1999]. *Barnea fragilis* (Sowerby, 1849), believed to be a synonym of *B. manilensis* [Taki and Habe, 1945; Habe, 1977a; Higo *et al.*, 1999], is recognized as a distinct species by Chinese malacologists [Xu and Zhang, 2008], clearly differing from *B. manilensis* as figured in that publication [l.c, fig. 844]. *Barnea elongata* Tchang, Tsi and Li, 1960 from China, a synonym of *B. manilensis* [Habe, 1977a; Xu and Zhang, 2008; syntypes of *B. elongata* figured by Lutaenko and Xu, 2008], is quite similar to a large elongated form from Peter the Great Bay, and may represent a valid species. A syntype of *B. manilensis inornata* is figured by Higo *et al.* [2001].

Of interest is our observation of the boring of hard rock by the small form of *B. manilensis* in SP; however, Japanese authors state that it bores soft rock (mudstone and shale) [Habe, 1977a; Ito, 1999]. The geographical distribution of this species is unclear. Although it was believed to be distributed only in the western Pacific, from the Philippines and South China Sea to Hokkaido [Higo *et al.*, 1999], Monari [2009] claims that *B. manilensis* is a widespread species in the Indo-Pacific extending from the north-eastern coast of South Africa to Japan. Scarlato [1981] mentioned its records from southern Sakhalin, but not MNP.

Biology and ecology: Smirnova [1973]; Scarlato [1981]; Kim I.-H. [2004].

308. *Barnea* (*Umitakea*) *japonica* (Yokoyama, 1920)

Pl. 62, Figs. E, F

Regional distribution: SK: Busan; **SP**.

Zonal-biogeographical characteristics: Subtropical.

Comments: Lutaenko [2005c] showed that *B. japonica* is a subtropical species extending to the north-western Sea of Japan/East Sea, and is known from both the Pacific and Sea of Japan/East Sea coasts of Japan and Korea, and also from the Yellow Sea. It is not a synonym of the distinctly tropical *Barnea* (*Umitakea*) *dilatata* (Souleyet, 1843).

Biology and ecology: Evseev [1986; 1993]; Kulikova and Kolotukhina [1989]; Kim I.-H. [2004]; Lutaenko [2004a].

309. *Zirfaea pilsbryi* Lowe, 1931
Pl. 63, Figs. C, D

Regional distribution: SP.
Zonal-biogeographical characteristics: ?Widely distributed boreal.
Comments: Coan *et al.* [2000] regarded Scarlato's [1981] records of "*Zirfaea crispata* (L., 1758)" as *Z. pilsbryi*. However, the latter is known only from the eastern Pacific, from the Arctic coast of Alaska to Bahía Magdalena, Baja California Sur [l.c.]
Biology and ecology: Kulikova and Kolotukhina [1989].

310. *Zirfaea subconstricta* (Yokoyama, 1924)

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Tropical-subtropical.
Comments: A record of *Zirfaea* cf. *subconstricta* from Ussuriysky Bay (SP) based on a broken valve [Lutaenko, 2005a] may belong to *Z. pilsbryi*. *Z. subconstricta* is smaller, from 40−46 mm in Japan and China [Okutani, 2000; Xu and Zhang, 2008], and narrower dorso-ventrally. Shells of *Zirfaea* from Peter the Great Bay reach 100−110 mm in length.
Biology and ecology: Kim I.-H. [2004].

311. *Penitella gabbii* (Tryon, 1863)

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: Records of *Penitella penita* (Conrad, 1837) in the western Pacific, including Scarlato [1981], represent *P. gabbii.*

312. *Penitella kamakurensis* (Yokoyama, 1922)
Pl. 63, Figs. A, B

Regional distribution: SK: Gyeongbuk, Gyeongnam; Busan.
Zonal-biogeographical characteristics: Subtropical.
Comments: Coan *et al.* [2000] mentioned that this species may be a synonym of *Penitella gabbii* (Tryon, 1863).

313. *Netastoma japonicum* (Yokoyama 1920)

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: This species was previously assigned to *Nettastomella* Carpenter, 1865, an unnecessary replacement name for *Netastoma* Carpenter, 1864 [Coan *et al*., 2000]. In Russian waters, Scarlato [1981] recorded this species only from southern Sakhalin, from both the Sea of Japan/East Sea and Sea of Okhotsk coasts.

314. *Neoxylophaga rikuzenica* (Iw. Taki et Habe, 1945)

Regional distribution: SK: Gangwon, Busan.
Zonal-biogeographical characteristics: Subtropical.

315. *Aspidopholas* sp.

Regional distribution: SK: Gyeongnam [Rho *et al.*, 1997].
Comments: This record may represent *Aspidopholas yoshimurai* Kuroda et Teramachi, 1930 known from the Sea of Japan/East Sea [Haga, 2010].

Family **Teredinidae** Rafinesque, 1815[12]

316. *Teredo navalis* L., 1758

Regional distribution: SK: Gyeongbuk, Gyeongnam; **NK**: Hamnam; **SP**; **MNP**.
Zonal-biogeographical characteristics: Circumsubtropical-boreal.

Biology and ecology: Karazin [1927]; Roch [1934]; Adrianov [1947]; Rjabtschikoff [1957]; Kasyanov *et al.* [1983]; Kulikova and Kolotukhina [1989]; Iljin [2008].

317. *Bankia* (*Bankia*) *setacea* (Tryon, 1863)
Pl. 63, Figs. E, F

Regional distribution: SK: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.

Biology and ecology: Roch [1934]; Adrianov [1947]; Rjabtschikoff [1957]; Kasyanov *et al.* [1983]; Kulikova and Kolotukhina [1989].

318. *Bankia* (*Lyrodobankia*) *carinata* (Gray, 1827)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.

319. *Zachsia zenkewitschi* Bulatoff et Rjabtschikoff, 1933

Regional distribution: SP.
Zonal-biogeographical characteristics: Subtropical.

Biology and ecology: Bulatoff and Rjabtschikoff [1933]; Roch [1934]; Turner and Yakovlev [1981; 1983]; Turner *et al.* [1983]; Yakovlev and Malakhov [1985; 1987]; Kiyashko [1986]; Yakovlev *et al.* [1998]; Drozdov *et al.* [1999].

320. *Lyrodus pedicellatu*s (de Quatrefages, 1849)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Circumsubtropical-boreal.

321. *Teredora princesae* (Sivickis, 1928)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Tropical-subtropical.

322. *Uperotus clava* (Gmelin, 1791)

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Tropical-subtropical.

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[12] *Bankia* (*Bankia*) *australis* (Calman, 1920), *Teredothyra excavata* (Jeffreys, 1860), and *Uperotus panamensis* (Bartsch, 1922) listed by Min D.-K. *et al.* [2004] do not inhabit this part of the Pacific and are therefore excluded from the Korean fauna.

Superfamily **HIATELLOIDEA** Gray, 1824

Family **Hiatellidae** Gray, 1824

323. *Hiatella arctica* (L., 1767) s.l.
Pl. 59, Figs. J, K

Regional distribution: SK: Gyeongbuk; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.

Biology and ecology: Golikov and Scarlato [1967]; Avdeev [1975]; Gabaev [1981; 2009; 2010a]; Kasyanov *et al.* [1983]; Rybakov [1983a]; Kulikova and Kolotukhina [1989]; Isaeva *et al.* [2001].

324. *Hiatella orientalis* (Yokoyama, 1920)

Regional distribution: SK: Gangwon, Gyeongnam.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: Relationships between this species and *H. arctica* s.l. are not clear. Whereas American workers [Coan *et al.*, 2000] regard *H. orientalis* as one of the 28 (!) synonyms of *H. arctica* ("with many additional synonyms throughout the world" – l.c., p. 485), Japanese, Korean, and some Russian authors [e.g., Evseev, 1981] recognize the former species as valid. Naumov *et al.* [2010] suggested that all synonyms of *H. arctica* should be placed in the list of rejected names, and descriptions of new species would be based on molecular methods. This would seriously violate zoological nomenclature and is virtually impossible.

325. *Panomya norvegica* (Spengler, 1793)
Pl. 60, Figs. E–H; Pl. 61, Figs. E–H

Regional distribution: SK: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Comments: This species was known for a long time as *Panomya arctica* (Lamarck, 1819). The name *Mya norvegica* Spengler, 1793 is not preoccupied by *Mya norwegica* Gmelin, 1791 [Coan *et al.*, 2000]. Photographs of "*P. arctica*" in Min D.-K. *et al.* [2004, fig. 1572] clearly represent *P. nipponica* Nomura and Hatai, 1935; therefore, records for the Korean coast may be unverified.

Biology and ecology: Yavnov [2000; partly *P. nipponica*].

326. *Panomya nipponica* Nomura et Hatai, 1935
Pl. 61, Figs. A–D

Regional distribution: SK; **SP**; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: This species was recognized quite recently in Russian waters of the Sea of Japan/East Sea (Peter the Great Bay, SP), and previously was confused with *P. norvegica* [Lutaenko, 1997]. Kolpakov [2008] recorded this species from MNP for the first time.

327. *Panomya priapus* (Tilesius, 1820)

Regional distribution: SK: Gangwon; **SP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: This species was known for a long time as *Panomya beringiana* Dall, 1916. Scarlato [1981] mentioned that empty shells only were found in Peter the Great Bay, along the Russian coast of the Sea of Japan/East Sea.

328. *Panomya ampla* Dall, 1898
Pl. 60, Figs. A–D

Regional distribution: SK: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: The holotype is figured by Higo *et al.* [2001].

329. *Panopea japonica* A. Adams, 1850
Pl. 62, Figs. A–D

Regional distribution: SK: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: *Panopea abrupta* (Conrad, 1849), described from the Miocene deposits of Oregon, was found to be indistinguishable from Japanese specimens by Bernard [1983a] and also Coan *et al.* [2000]. However, Vadopalas *et al.* [2010] showed that the Recent species *Panopea generosa* Gould, 1850 (type locality: Puget Sound, Washington) is clearly different from fossil *P. abrupta*, and the former binomen is unquestionably the proper name for the Pacific geoduck. Molecular study is necessary to understand the identity of the north-western Pacific *Panopea*, and we prefer to use the name *P. japonica* until the problem is fully resolved. The holotype of *P. japonica* was illustrated by Bijl and Moolenbeek [1995] and Higo *et al.* [2001].

Although Scarlato [1981] recorded this species only from SP, Evseev [1981] found *P. japonica* in Kievka and Olga bays in MNP.

Biology and ecology: Zolotarev [1976]; Kim H.S. *et al.* [1991]; Lee C.S. [1997]; Lee C.S. *et al.* [1997; 1998]; Lee C.S. and Rho [1997]; Yavnov [2000].

Superfamily **SOLENOIDEA** Lamarck, 1809

Family **Solenidae** Lamarck, 1809

330. *Solen* (*Solen*) *strictus* Gould, 1861
Pl. 53, Figs. M, N; Text-fig. 46

Regional distribution: SK: Gangwon, Gyeongnam, Gyeongbuk, Busan; **SP**.
Zonal-biogeographical characteristics: Subtropical.

Biology and ecology: Chung E.-Y. *et al.* [1986]; Rybakov [1986]; Yavnov [2000]; Kim I.-H. [2004]; Lutaenko [2004a]; Mok *et al.* [2010].

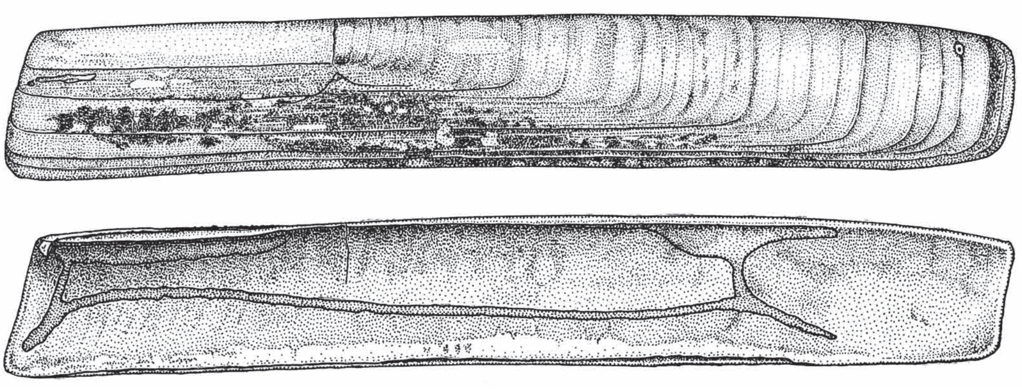

Fig. 46. *Solen* (*Solen*) *strictus* Gould, 1861: SP, Ussuriysky Bay, Sukhodol Bay, shell length 98.9 mm, ZMFU 10130/Bv-565.

331. *Solen* (*Solen*) *gordonis* Yokoyama, 1920

Pl. 53, Figs. K, L

Regional distribution: SK: "all parts" [Kwon and Lee, 1993].

Zonal-biogeographical characteristics: Subtropical.

Biology and ecology: Chung E.-Y. *et al.* [1986]; Mok *et al.* [2010].

332. *Solen* (*Solen*) *grandis* Dunker, 1861

Regional distribution: SK: Gyeongnam, Busan.

Zonal-biogeographical characteristics: Tropical-subtropical.

Comments: A syntype is figured by Higo *et al.* [2001].

Biology and ecology: Chung E.-Y. *et al.* [2006]; Mok *et al.* [2010].

333. *Solen* (*Ensisolen*) *krusensterni* Schrenck, 1867

Pl. 53, Figs. G–J; Text-fig. 47

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam; **NK**: Hambuk, Hamnam, Gangwon; **SP**; **MNP**.

Zonal-biogeographical characteristics: Subtropical-lowboreal.

Comments: This species was recently found along the Primorye coast as far north as Russkaya Bay, and there is some evidence that it might occur north to Tatarsky Strait [Kolpakov, 2009].

Biology and ecology: Zolotarev [1976; 1980; 1989]; Evseev [1981]; Kasyanov *et al.* [1983]; Rybakov [1986]; Kulikova and Kolotukhina [1989]; Yavnov [2000].

Family **Pharidae** H. Adams et A. Adams, 1856

334. *Siliqua alta* (Broderip et Sowerby I, 1829)

Pl. 53, Figs. O, P; Text-fig. 48

Regional distribution: SK: Busan; **NK**: Hambuk; **SP**; **MNP**.

Zonal-biogeographical characteristics: Widely distributed boreal.

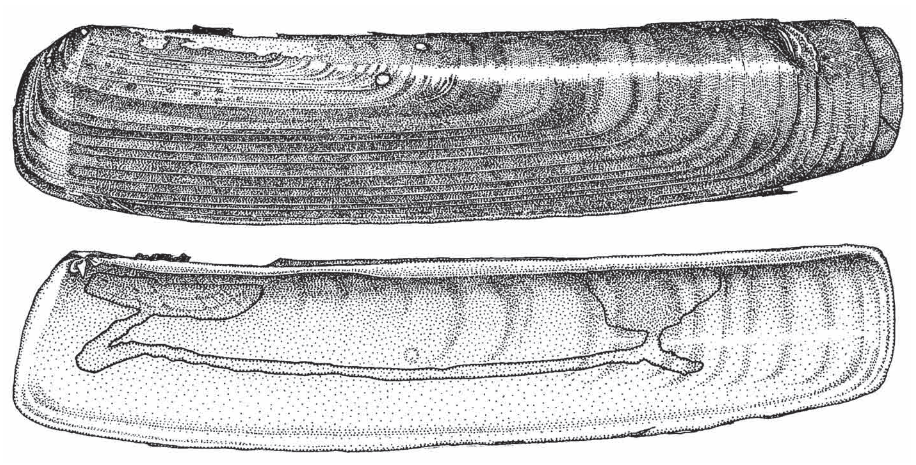

Fig. 47. *Solen* (*Ensisolen*) *krusensterni* Schrenck, 1867: SP, Possjet Bay, Mramornaya Bay, shell length 79.5 mm, ZMFU 8964/Bv-64.

Biology and ecology: Zolotarev [1976]; Evseev [1981]; Kasyanov *et al.* [1983]; Rybakov [1986]; Kulikova and Kolotukhina [1989]; Selin [1999c]; Yavnov [2000].

335. *Siliqua pulchella* (Dunker, 1852)

Pl. 54, Figs. A, B

Regional distribution: SK: Gyeongbuk, Busan; **NK**: Hamnam.

Zonal-biogeographical characteristics: Subtropical.

336. *Sinonovacula constricta* (Lamarck, 1818)

Regional distribution: SK: Gyeongbuk, Busan.

Zonal-biogeographical characteristics: Subtropical.

Biology and ecology: Kim I.-H. [2004].

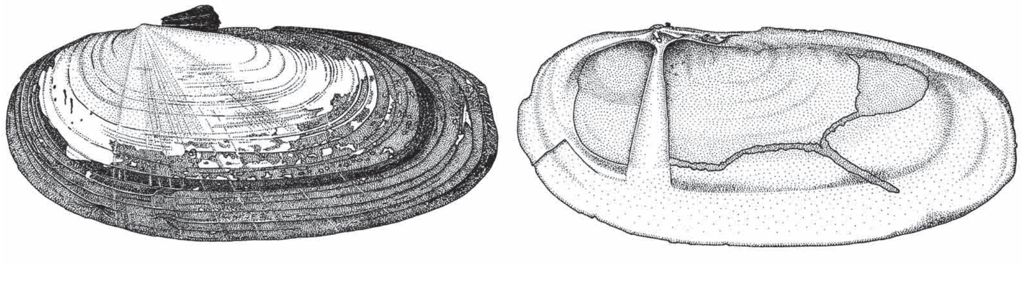

Fig. 48. *Siliqua alta* (Broderip et Sowerby I, 1829): SP, Possjet Bay, Reid Pallada Bay, Churkhado (Nazimova) Spit, shell length 56.7 mm, ZMFU 11339/Bv-1371.

Superfamily **GASTROCHAENOIDEA** Gray, 1840

Family **Gastrochaenidae** Gray, 1840

337. *Gastrochaena* (*Gastrochaena*) *cuneiformis* Spengler, 1783

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Tropical-subtropical.

338. *Gastrochaena* (*Cucurbitula*) *cymbium* Spengler, 1783

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.

Superfamily **MYOCHAMOIDEA** P.P. Carpenter, 1861

Family **Myochamidae** P.P. Carpenter, 1861

339. *Myadora japonica* Habe, 1950
Pl. 63, Figs. I, J

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.
Comments: Higo *et al.* [1999] regard this species as a synonym of *Myadora fluctuosa* Gould, 1861. The holotypes of *M. japonica* and *M. fluctuosa* are figured by Johnson [1964; *M. fluctuosa*] and Higo *et al.* [2001; both species].

340. *Myadora reeveana* (Smith, 1880)
Pl. 63, Figs. K–N

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.
Comments: Two syntypes (NHM) are figured by Higo *et al.* [2001].

341. *Myadoropsis transmontana* (Yokoyama, 1922)
Pl. 63, Figs. G, H

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.

Superfamily **PANDOROIDEA** Rafinesque, 1815

Family **Pandoridae** Rafinesque, 1815

342. *Pandora* (*Heteroclidus*) *pulchella* Yokoyama, 1926
Pl. 64, Figs. E, F; Text-fig. 49

Regional distribution: SK: Gangwon; **NK**: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Subtropical-lowboreal.

Biology and ecology: Golikov and Scarlato [1981]; Zolotarev [1976; 1980; 1989]; Evseev [1981]; Scarlato [1981]; Yavnov [2000].

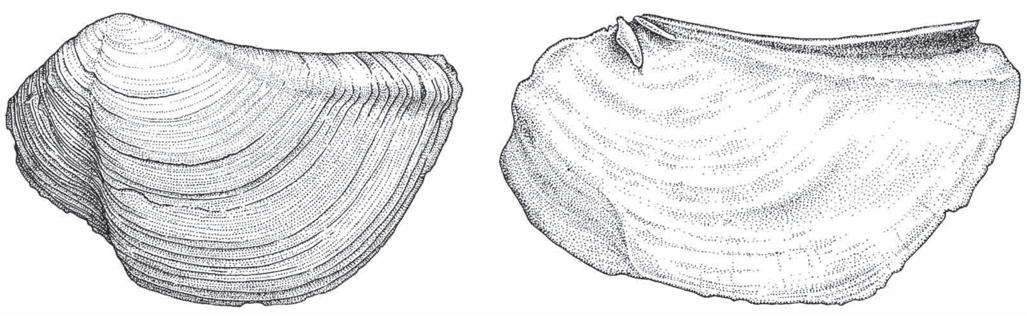

Fig. 49. *Pandora* (*Heteroclidus*) *pulchella* Yokoyama, 1926: MNP, Kievka Bay, shell length 29.3 mm, ZMFU 10819/Bv-1061.

343. *Pandora* (*Pandorella*) *wardiana* A. Adams, 1860

Pl. 64, Figs. A–D

Regional distribution: SK: Gangwon; **SP**; **MNP**.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: The holotype (NHM) is figured by Higo *et al.* [2001].

Biology and ecology: Scarlato [1981]; Radashevsky [1993]; Tokmakova *et al.* [2006].

344. *Pandora* (*Pandorella*) *carinata* (Prashad, 1932)

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Tropical-subtropical.

Family **Lyonsiidae** P. Fischer, 1887

345. *Lyonsia arenosa* (Möller, 1842)

Pl. 64, Figs. G, H

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal-arctic.
Comments: See comments for *Lyonsia ventricosa* A.A. Gould, 1861.

Biology and ecology: Scarlato [1981].

346. *Lyonsia nuculanoformis* Scarlato in Volova et Scarlato, 1980

Pl. 65, Figs. A–H; Text-fig. 50

Regional distribution: SK: Gyeongbuk; **SP**; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: This species was formally described in a guide-book for students [Volova and Scarlato, 1980] without designation of a holotype, and one year later it was re-described by Scarlato [1981] with an illustration of the "holotype" which must be considered as lectotype according to the ICZN. It was known originally from SP and MNP, from Peter the Great Bay to Sovetskaya Gavan and Chikhacheva (De Kastri) Bay, but later was found in Yeongil Bay in SK [Lutaenko *et al.*, 2003].

Biology and ecology: Scarlato [1981].

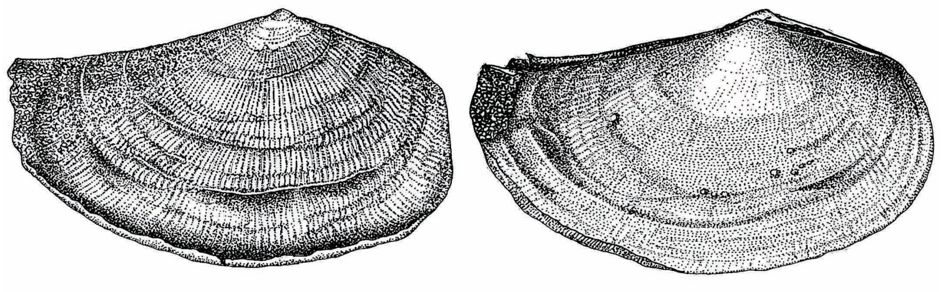

Fig. 50. *Lyonsia nuculanoformis* Scarlato in Volova et Scarlato, 1980: SP, Vostok Bay, shell length 16.5 mm, ZMFU 31871/Bv-5009.

347. *Lyonsia ventricosa* A.A. Gould, 1861

Pl. 64, Figs. I, J

Regional distribution: SK: Gangwon, Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.
Comments: Kafanov [1991] and Coan *et al.* [2000] synonymized *L. ventricosa* with panarctic and circumboreal *L. arenosa*. Illustrations of *L. ventricosa* in Japanese publications [Kuroda *et al.*, 1971, pl. 103, fig. 18; Fukuda *et al.*, 1992, fig. 585; Tsuchida and Kurozumi, 1996, pl. 5, fig. 6], and those from Korea [Kwon *et al.*, 2001, fig. 1156; Min D.-K. *et al.*, 2004, fig. 1608] show that this species clearly differs from *L. nuculanoformis* and seems to be a subtropical species distributed as far south as Taiwan [Bernard *et al.*, 1993; Higo *et al.*, 1999]. *L. nuculanoformis* is a low-boreal species occurring in the Sea of Japan/East Sea. "*L. ventricosa*" from northern Hokkaido [Tsuchida, 1998, pl. 5, fig. 8] seems to be the same species that was illustrated by Scarlato [1981, photographs 203−204] under the caption "*Lyonsia sp.*" from the Okhotsk Sea. Another allied species, *Lyonsia kawamurai* Habe, 1952, described from Sagami Bay, is also known from off the Noto Peninsula (Sea of Japan/East Sea side of Honshu). It is distinguished from *L. ventricosa* in having the posterior margin not rostrated but broadly truncated [Habe, 1952, p. 154, pl. 22, fig. 1]. Although the majority of Japanese and some Chinese authors [Xu, 1992; 1997], regarded *L. kawamurai* as a distinct species, Bernard *et al.* [1993] and Higo *et al.* [1999] synonymized it with *L. ventricosa*. Two more synonyms of *L. ventricosa* are often mentioned in Asian literature, *Lyonsia rostrata* Lischke, 1874 and *Lyonsia praetenuis* Dunker, 1882, e.g., Habe [1952], but they are not listed in the synonymy of *L. arenosa* by Coan *et al.* [2000].

348. *Bentholyonsia teramachii* (Habe, 1952)

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Subtropical.

349. *Entodesma navicula* (A. Adams et Reeve, 1850)

Pl. 65, Figs. I–L; Text-figs. 51, 52

Regional distribution: SK: Gangwon, Gyeongbuk, Gyeongnam; **SP**; **MNP**.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: The type locality of this species is Borneo [Adams and Reeve, 1850]; the holotype is figured here (Fig. 52). Scarlato [1981] separated the temperate *Entodesma naviculoides* Yokoyama, 1922 and the rather subtropical *E. navicula*. However, Coan *et al.* [2000] synonymized them, showing the distribution of *E. navicula* only as far south as the Kurile Islands and northern Japan in the NW Pacific.

Biology and ecology: Zolotarev [1976; 1989]; Scarlato [1981].

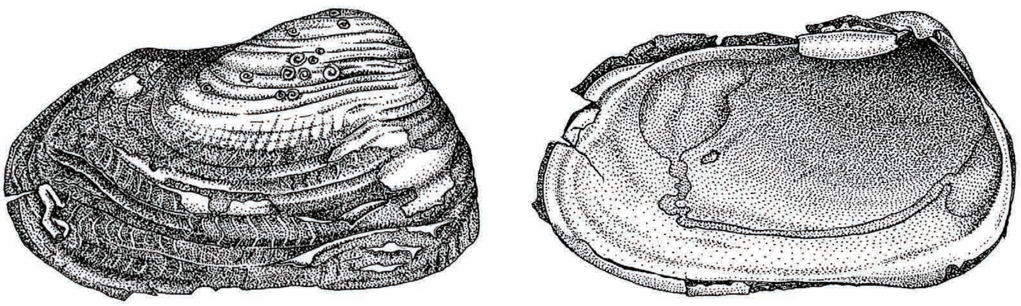

Fig. 51. *Entodesma navicula* (A. Adams et Reeve, 1850): SP, Ussuriysky Bay, Russky Island, Karpinskogo Bay, shell length 52.2 mm, ZMFU 31875/Bv-5013.

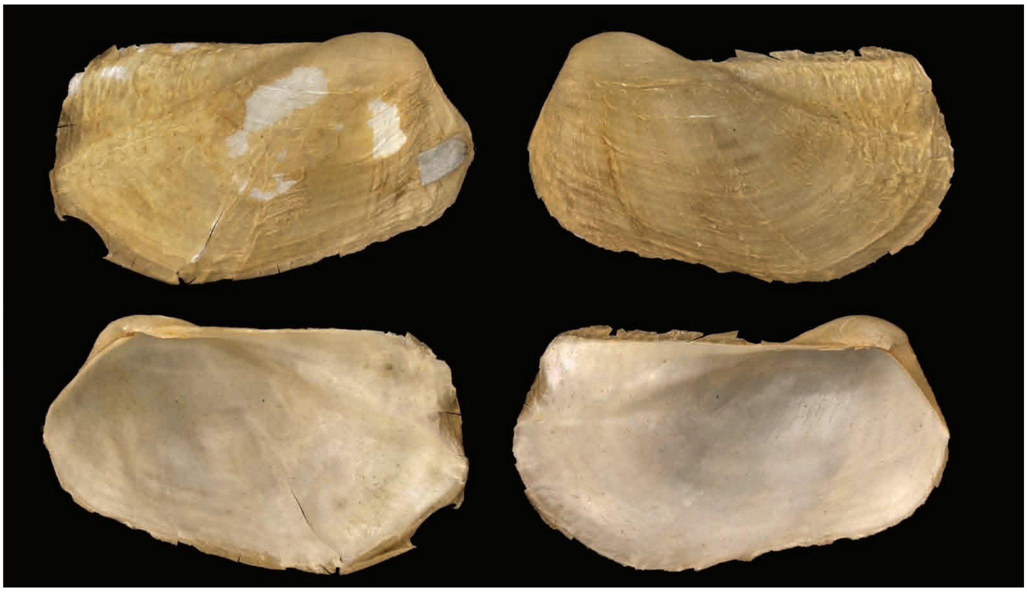

Fig. 52. *Lyonsia navicula* A. Adams et Reeve, 1850: holotype, "shores of Borneo", NHM reg. no. 20040519.

Superfamily **THRACIOIDEA** Stoliczka, 1870

Family **Thraciidae** Stoliczka, 1870

350. *Thracia* (*Thracia*) *myopsis* Möller, 1842

Regional distribution: **SP**.

Zonal-biogeographical characteristics: Widely distributed boreal-arctic.

Comments: A southern Sakhalin record [Scarlato, 1981] suggests that it can also be found in MNP.

Biology and ecology: Scarlato [1981].

351. *Thracia* (*Homoeodesma*) *itoi* Habe, 1961
Pl. 66, Figs A–D; Text-fig. 53

Regional distribution: **SK**: Gangwon; **SP**; **MNP**.

Zonal-biogeographical characteristics: Lowboreal.

Comments: The holotype is figured by Higo *et al.* [2001].

Biology and ecology: Golikov and Scarlato [1967]; Scarlato [1981].

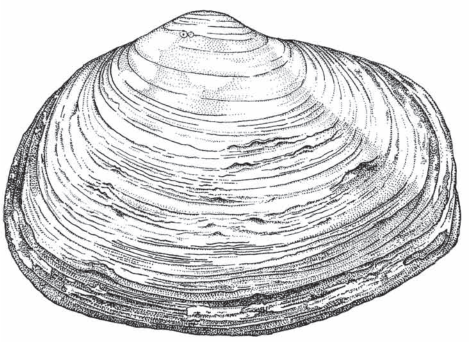

Fig. 53. *Thracia* (*Homoeodesma*) *itoi* Habe, 1961: SP, Ussuriysky Bay, Sukhodol Bay, shell length 41.9 mm, ZMFU 10159/Bv-594.

352. *Thracia* (*Homoeodesma*) *kakumana* (Yokoyama, 1927)
Pl. 66, Figs. E, F

Regional distribution: **SK**: Gangwon; **NK**: Hamnam, Gangwon; **SP**.

Zonal-biogeographical characteristics: Lowboreal.

Comments: This species is known from southern Sakhalin [Scarlato, 1981], and might be found in MNP. Following Coan [1990] and Matsubara [2009], we assign this and the previous species to the subgenus *Homoeodesma* Fischer, 1887.

353. *Thracia* (*Crassithracia*) *septentrionalis* Jeffreys, 1872

Regional distribution: **SP**.

Zonal-biogeographical characteristics: Widely distributed boreal-arctic.

Comments: *Thracia seminuda* Scarlato, 1981 is a synonym of this species [Coan *et al.*, 2000]. A southern Sakhalin record [Scarlato, 1981] suggests that it can also be found in MNP.

354. *Parvithracia* (*Pseudoasthenothaerus*) *lukini* Kamenev, 2002

Regional distribution: SP; **MNP** (Tatarsky Strait).
Zonal-biogeographical characteristics: Widely distributed boreal.
Biology and ecology: Kamenev [2002].

355. *Eximiothracia concinna* (Gould, 1861)

Regional distribution: SK: Gangwon.
Zonal-biogeographical characteristics: Subtropical.

Family **Laternulidae** Hedley, 1818

356. *Laternula* (*Laternula*) *anatina* (L., 1758)

Pl. 67, Figs. A, B

Regional distribution: SK: Gyeongbuk, "east coast" [Kwon and Lee, 1993].
Zonal-biogeographical characteristics: Tropical-subtropical.
Biology and ecology: Lutaenko *et al.* [2003].

357. *Laternula* (*Exolaternula*) *marilina* (Reeve, 1860)

Pl. 66, Figs. G–J

Regional distribution: SK: Busan; **SP**.
Zonal-biogeographical characteristics: Tropical-subtropical.
Biology and ecology: Golikov and Scarlato [1967]; Zolotarev [1976]; Scarlato [1981]; Komendantov [1986]; Komendantov and Orlova [1990; 1991]; Kang C.-K. *et al.* [2006].

Family **Periplomatidae** Dall, 1895

358. *Periploma* (*Septentrioploma*) *aleuticum* (Krause, 1885)

Regional distribution: SP.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: Scarlato [1981] recorded this species as the northwestern Atlantic "*Periploma fragilis* (Totten, 1835)", and then re-described it as *Periploma subfragilis* Scarlato and Kafanov, 1988 [Scarlato and Kafanov, 1988]. Coan *et al*. [2000] listed the latter as a possible synonym of *P. aleuticum.*

Superfamily **CUSPIDARIOIDEA** Dall, 1886

Family **Cuspidariidae** Dall, 1886

359. *Cuspidaria hindsiana* (A. Adams, 1864)

Pl. 67, Figs. F, G

Regional distribution: SK: Gyeongbuk.
Zonal-biogeographical characteristics: Tropical-subtropical.

360. *Cuspidaria ascoldica* Scarlato, 1972

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.

361. *Cuspidaria obtusirostris* Okutani, 1962

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.

362. *Austroneaera semipellucida* (Kuroda, 1948)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Widely distributed boreal (Japan, Korea, Alaska to Oregon – Coan *et al.* [2000]).

363. *Cardiomya tosaensis* (Kuroda, 1948)

Regional distribution: SK: Gyeongnam.
Zonal-biogeographical characteristics: Subtropical.
Comments: The holotype is figured by Higo *et al.* [2001].

364. *Cardiomya behringensis* (Leche, 1883)
Pl. 67, Figs. C, D

Regional distribution: SK: Gangwon.
Zonal-biogeographical characteristics: Widely distributed boreal.
Comments: *Cardiomya behringensis okutanii* Scarlato, 1972 is a synonym [Coan *et al.*, 2000].

365. *Cardiomya gouldiana* (Hinds, 1843)
Pl. 67, Fig. E

Regional distribution: SP; **MNP**.
Zonal-biogeographical characteristics: Lowboreal.
Comments: According to Kafanov [1991], *Cardiomya lindbergi lindbergi* Scarlato, 1972 and *Cardiomya lindbergi batialis* Scarlato, 1972 are synonyms of this species. A possible syntype of *C. gouldiana* is figured by Higo *et al.* [2001].

Superfamily **POROMYOIDEA** Dall, 1886

Family **Poromyidae** Dall, 1886

366. *Dermatomya tenuiconcha* (Dall, 1913)

Regional distribution: SK: “southeast coast” [Min D.-K. *et al.*, 2004].
Zonal-biogeographical characteristics: Widely distributed boreal.

367. *Poromya castanea* Habe, 1952
Pl. 67, Figs. H–K

Regional distribution: MNP.
Zonal-biogeographical characteristics: Subtropical-lowboreal.
Comments: The holotype is figured by Higo *et al.* [2001].

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Explanations of Plates 1–5

Plate 1

Figs. A–D. *Acila* (*Acila*) *divaricata* (Hinds, 1843). **MNP**: northern part of the Sea of Japan/East Sea, depth 150 m, length 15.8 mm, ZMFU 10483/Bv-810.
Figs. E, F. *A.* (*A.*) *divaricata* (Hinds, 1843): **SK**: Busan, Gwangalli Beach, length 26 mm, RGN collection.
Figs. G–J. *Acila* (*Truncacila*) *insignis* (Gould, 1861). **SP**: Possjet Bay, Novgorodskaya Bay, depth 3–5 m, length 15.5 mm, ZMFU 10698/Bv-965.
Figs. K, L. *Nucula* (*Ennucula*) *tenuis* (Montagu, 1808). **MNP**: Tatarsky Strait, subtidal, length 10.9 mm, ZMFU 12942/Bv-1704.
Figs. M, N. *N.* (*E.*) *tenuis* (Montagu, 1808). **SK**: Yeongil Bay, depth 27.5 m, length 8.3 mm, ZMFU 19867/Bv-3021.
Figs. O, P. *Nucula* (*Ennucula*) *ovatotruncata* (Scarlato in Volova et Scarlato, 1980). **SP**: Peter the Great Bay, Boysmana Bay, depth 11 m, length 6.8 mm, ZMFU 12939/Bv-1701.
Figs. Q–T. *Nuculana* (*Nuculana*) *sadoensis* (Yokoyama, 1926). **SP**: Peter the Great Bay, depth 20–220 m, length 19.0 mm, ZMFU 20810/Bv-3365.

Plate 2

Figs. A–D. *Megayoldia thraciaeformis* (Storer, 1838). **SP**: Possjet Bay, depth 38 m, length 48.1 mm, ZMFU 17328/Bv-2387.
Figs. E, F. *Nuculana* (*Nuculana*) *minuta* (Müller, 1776). **SP**: Peter the Great Bay, depth 56 m, length 4.9 mm, ZMFU 27791/Bv-4710.
Figs. G–J. *Yoldia* (*Cnesterium*) *toporoki* Scarlato, 1981. **MNP**: Tatarsky Strait, subtidal, length 18.4 mm, ZMFU 15864/Bv-2078.

Plate 3

Figs. A–D. *Yoldia* (*Cnesterium*) cf. *johanni* Dall, 1925. **SP**: Peter the Great Bay, Anna Bay, depth 17 m, length 39.6 mm, ZMFU 14934/Bv-1916.
Figs. E–H. *Yoldia* (*Cnesterium*) cf. *keppeliana* (Sowerby III, 1904). **SP**: Possjet Bay, Reid Pallada Bay, Churkhado (Nazimova) Spit, length 38.5 mm, ZMFU 14936/Bv-1918.
Figs. I, J. *Yoldia* (*Cnesterium*) *seminuda* Dall, 1871. **MNP**: Tatarsky Strait, subtidal, length 21.9 mm, ZMFU 15861/Bv-2075.

Plate 4

Figs. A–D. *Anadara* (*Scapharca*) *broughtonii* (Schrenck, 1867). **SP**: Amursky Bay, depth 4 m, length 83.7 mm, ZMFU 12635/Bv-1636.
Figs. E–H. *A.* (*S.*) *broughtonii* (Schrenck, 1867). **SP**: Ussuriysky Bay, length 86.5 mm, ZMFU 16574/Bv-2268.

Plate 5

Figs. A–D. *Anadara* (*Scapharca*) *kagoshimensis* (Tokunaga, 1906). **SK**: Korea, length 39.1 mm, ZMFU 32623/Bv-5032.
Figs. E–H. *Arca boucardi* Jousseaume, 1894. **SP**: Amursky Bay, length 46.8 mm, ZMFU 10423/Bv-772.

Plate 1

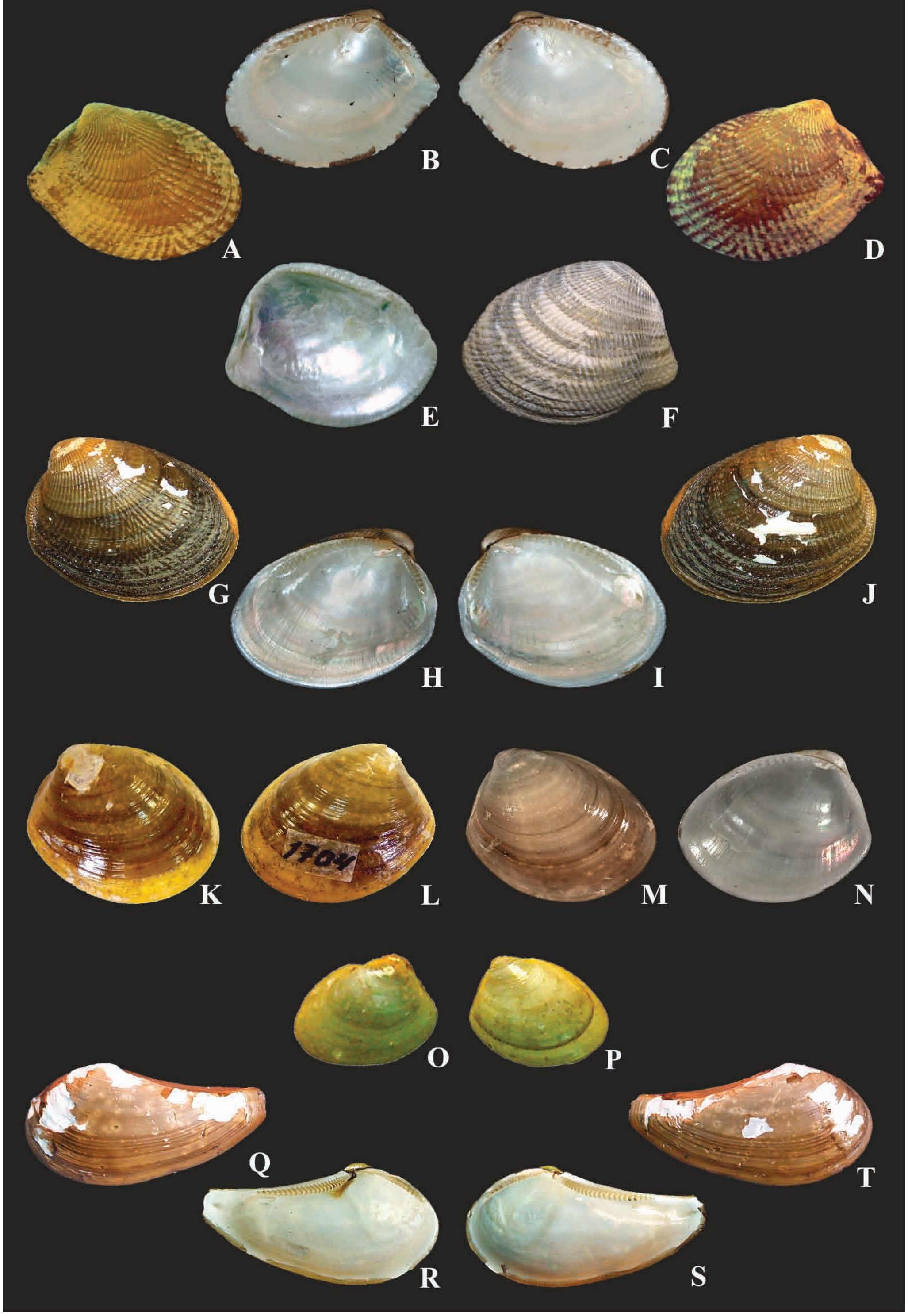
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Plate 2

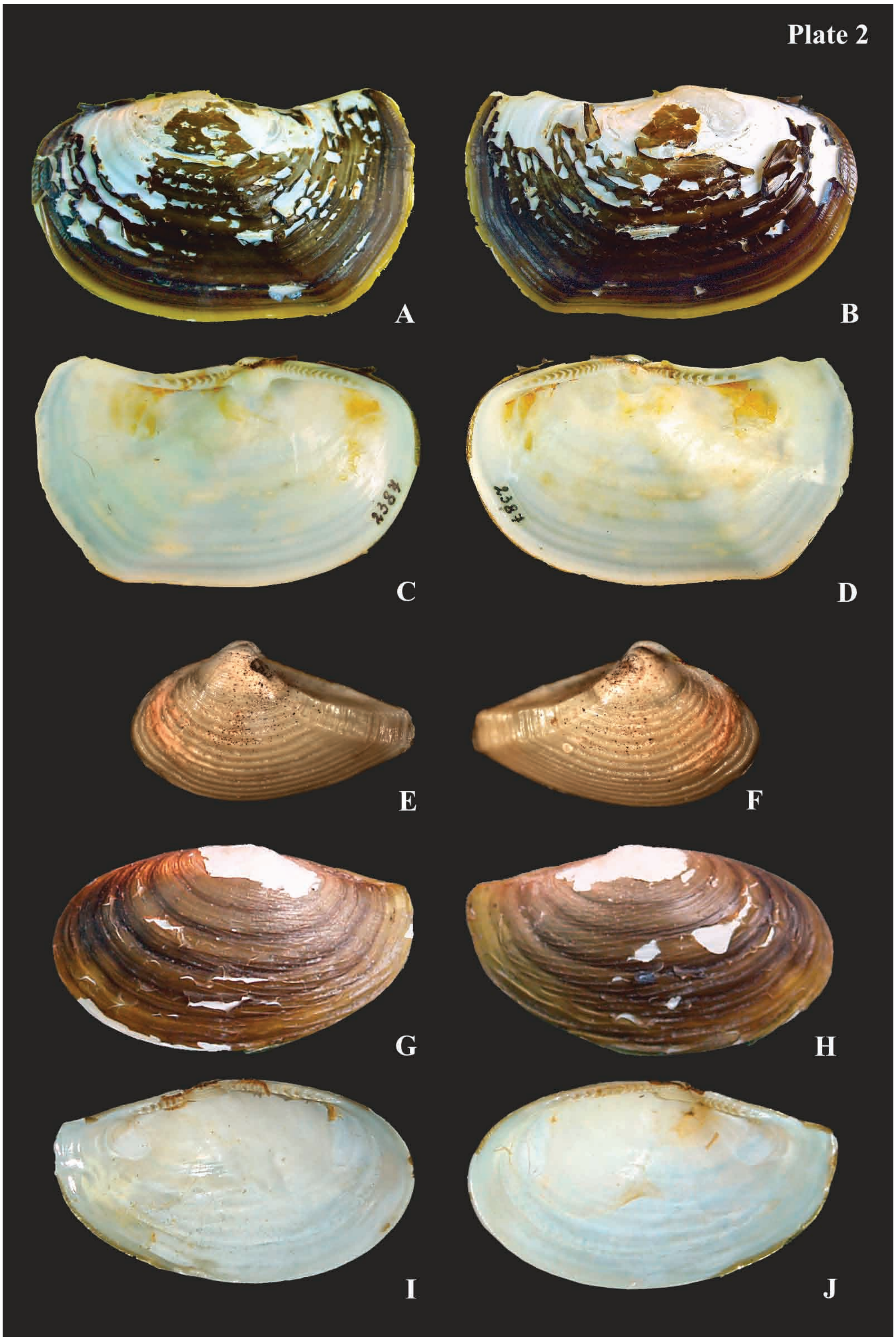
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Plate 3

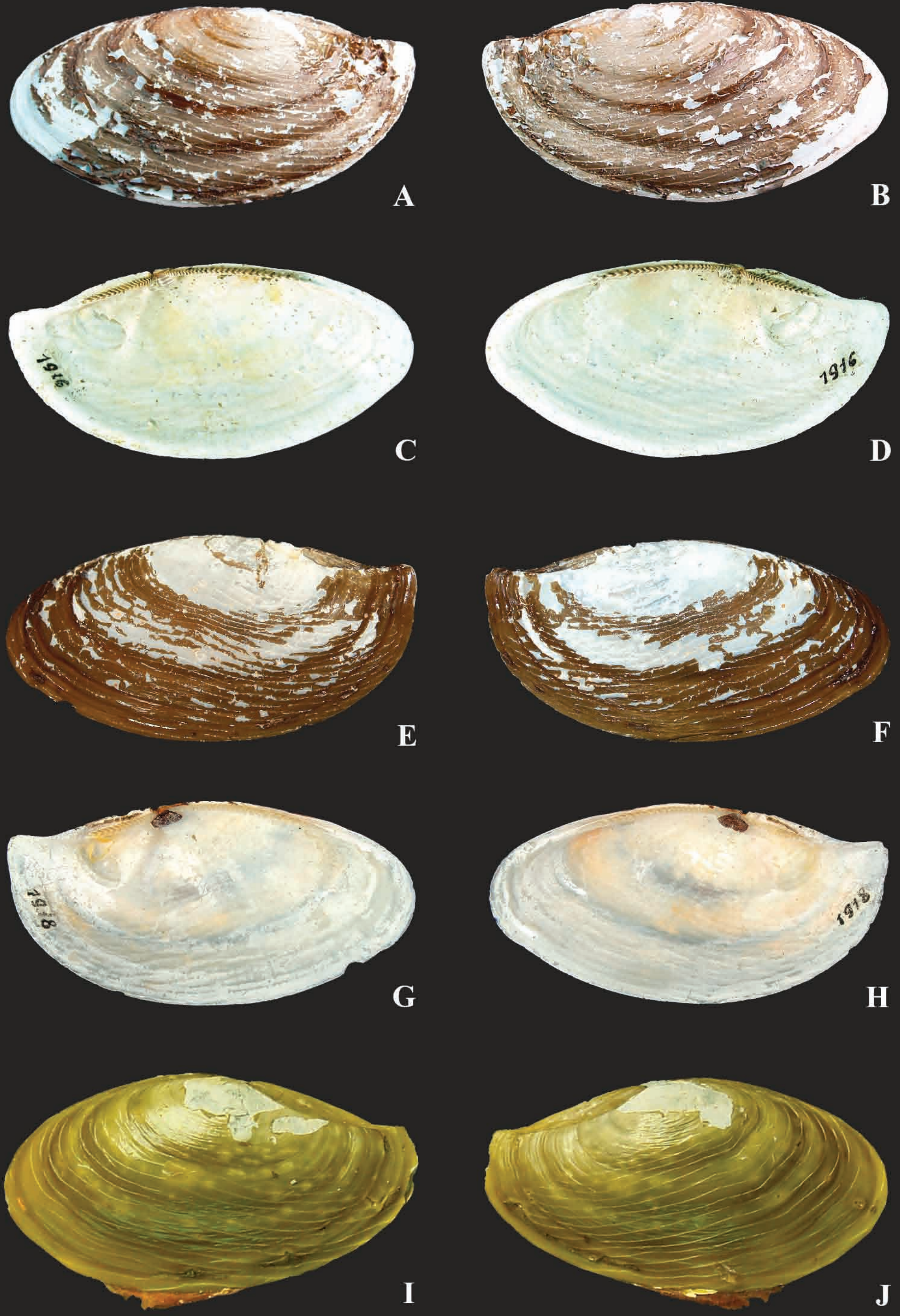
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Plate 4

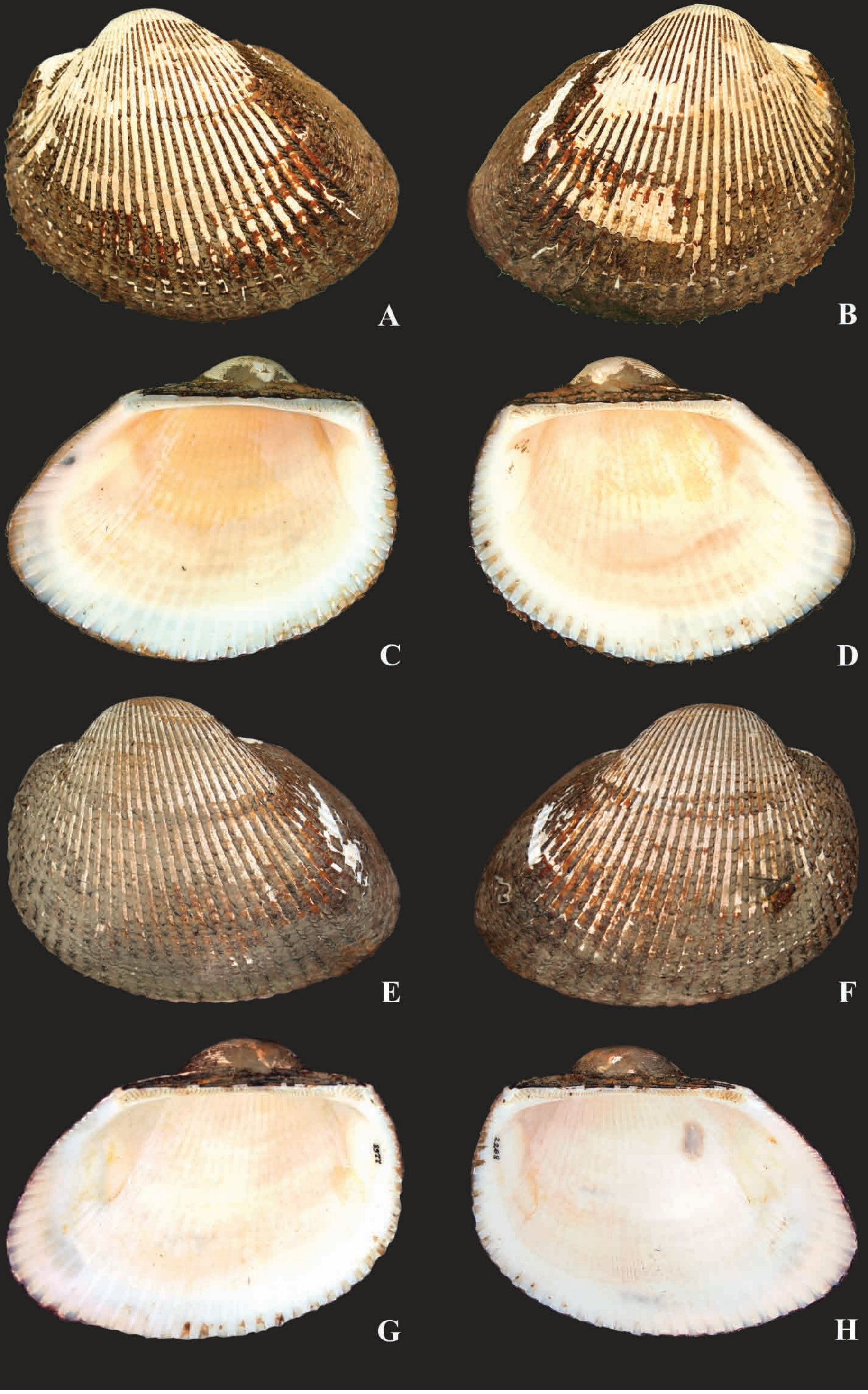
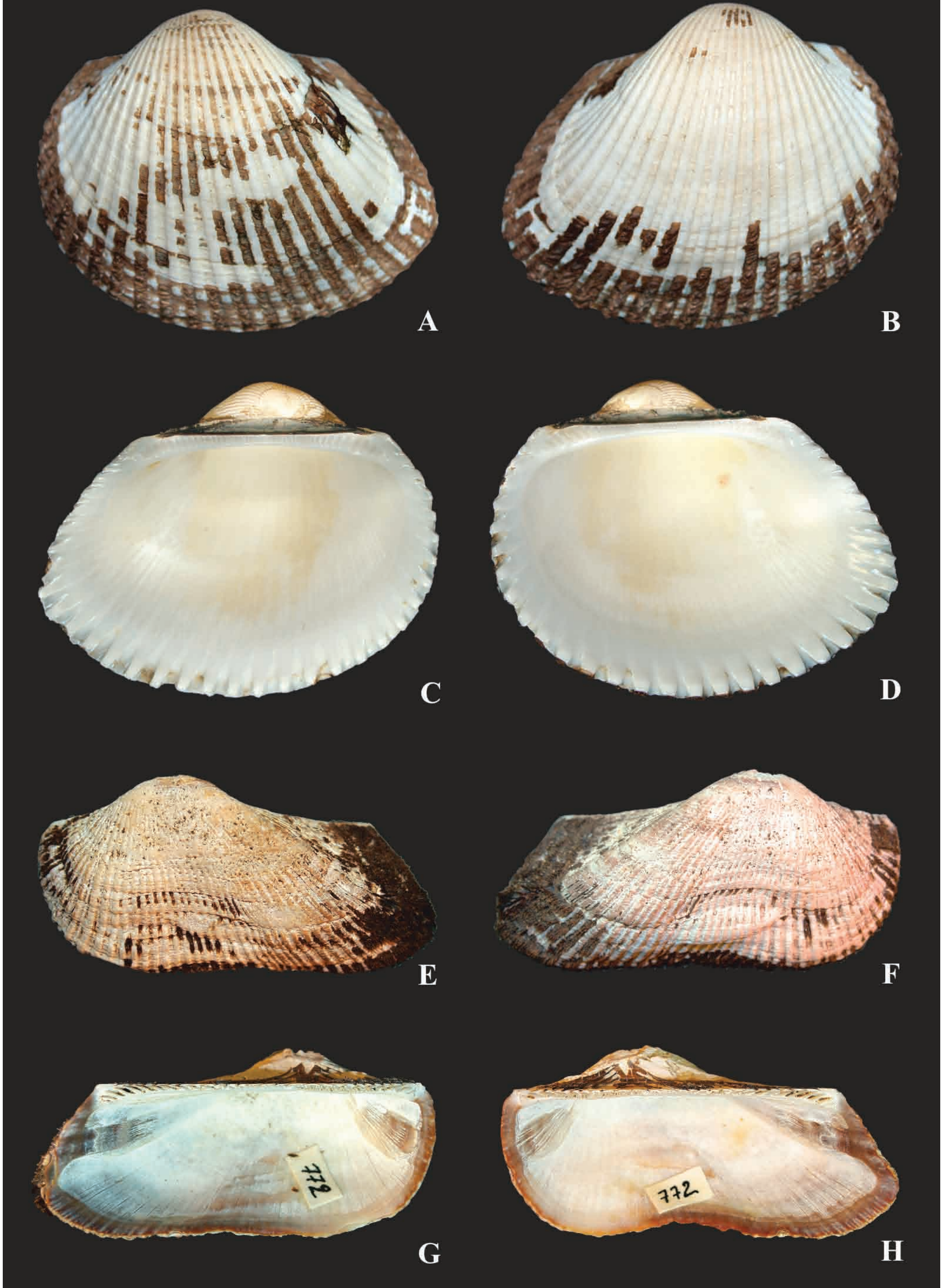


Plate 5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Explanations of Plates 6–10

Plate 6

Figs. A, B. *Arca avellana* Lamarck, 1819. **SK**: Busan, Gwangalli Beach, length 19 mm, RGN collection.

Figs. C, D. *Striarca symmetrica* (Reeve, 1844). **SK**: Busan, Songyeong Beach, length 11 mm, RGN collection.

Figs. E, F. *Nipponarca bistrigata* (Dunker, 1866). **SK**: Busan, Haeundae Beach, length 14 mm, RGN collection.

Figs. G, H. *Porterius dalli* (E.A. Smith, 1885). **SK**: Busan, Mollundae Is., length 22 nm, RGN collection.

Plate 7

Figs. A, B. *P. dalli* (E.A. Smith, 1885). **SK**: Busan, Haeundae Beach, length 32 mm, RGN collection.

Figs. C–F. *Glycymeris* (*Glycymeris*) *yessoensis* (Sowerby III, 1889): **SP**: Peter the Great Bay, Reineke Is., length 32.6 mm, ZMFU 10853/Bv-1088.

Plate 8

Figs. A, B. *Glycymeris* (*Glycymeris*) *aspersa* (A. Adams et Reeve, 1850). **SK**: Gyeongbuk Province, near Chukpyon (Jukbyeon), length 58.3 mm, ZMFU 19505/Bv-2917.

Figs. C, D. *Glycymeris* (*Glycymeris*) cf. *rotunda* (Dunker, 1882). **SK**: Gangwon Province, between Cape Sachondan and Yongok River mouth, length 29.5 mm, ZMFU 19513/Bv-2925.

Figs. E, F. *Tucetonella munda* (Sowerby III, 1903). **SK**: Busan, Haeundae Beach, length 15 mm, RGN collection.

Plate 9

Figs. A–D. *Empleconia cumingii* (A. Adams, 1863). **SK**: Yeongil Bay, depth 25 m, length 14.6 mm, ZMFU 19300/Bv-2793.

Figs. E, F. *Adula falcatoides* Habe, 1955. **SP**: Vostok Bay, length 43.9 mm, ZMFU 9888/Bv-430.

Figs. G–J. *Arvella* cf. *japonica* (Dall, 1897). **MNP**: Tatarsky Strait, Adimi (Sufren) Bay, depth 15 m, length, ZMFU 10510/Bv-820.

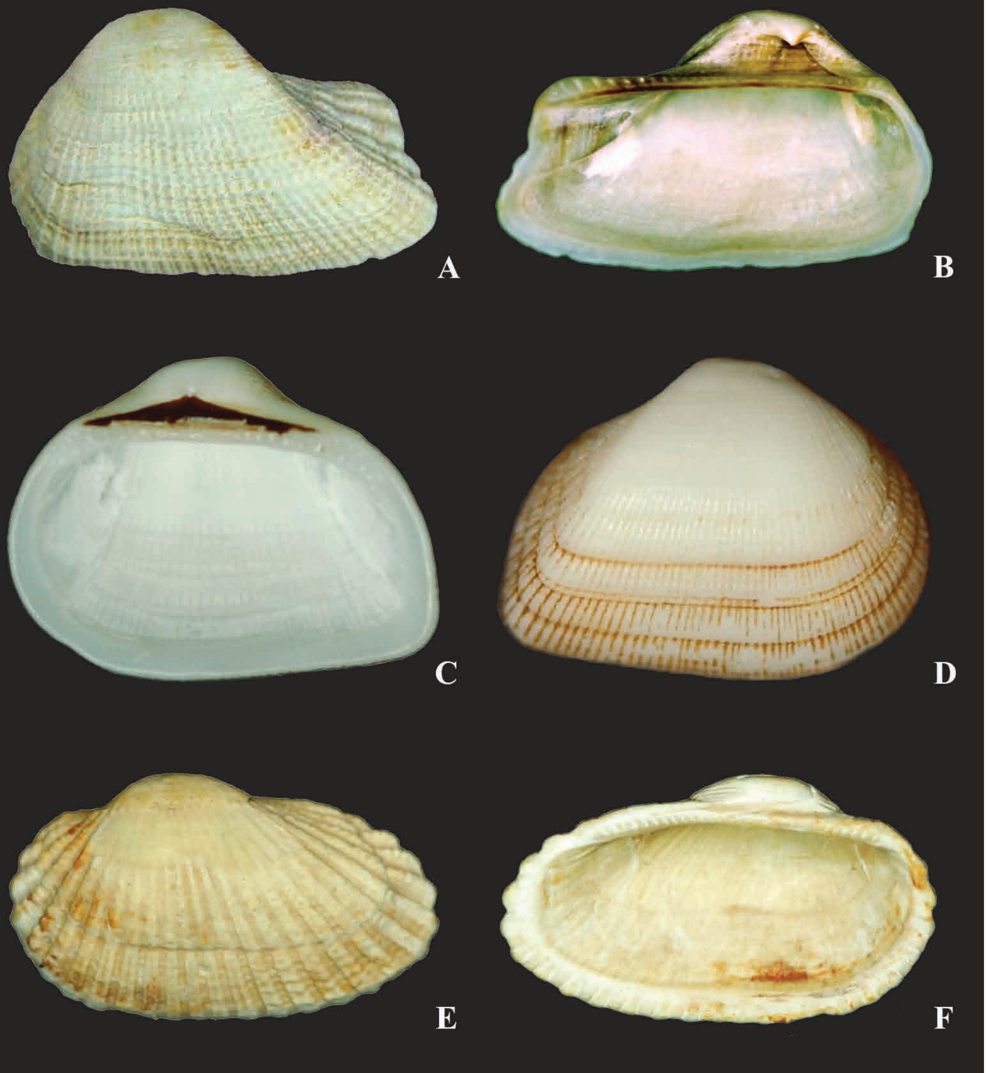
Plate 10

Figs. A–D. *Crenomytilus grayanus* (Dunker, 1853). **SP**: Amursky Bay, Narva Bay, length 67.9 mm, ZMFU 19388/Bv-2859.

Figs. E, F. *Modiolus* (*Modiolus*) *auriculatus* (Krauss, 1848). **SK**: Yeongil Bay, length 25.4 mm, ZMFU 19858/Bv-3012.

Figs. G–J. *Modiolus* (*Modiolus*) *kurilensis* Bernard, 1983. **SP**: Peter the Great Bay, Putyatina Is., length 81.4 mm, ZMFU 28553/Bv-4860.

Plate 6



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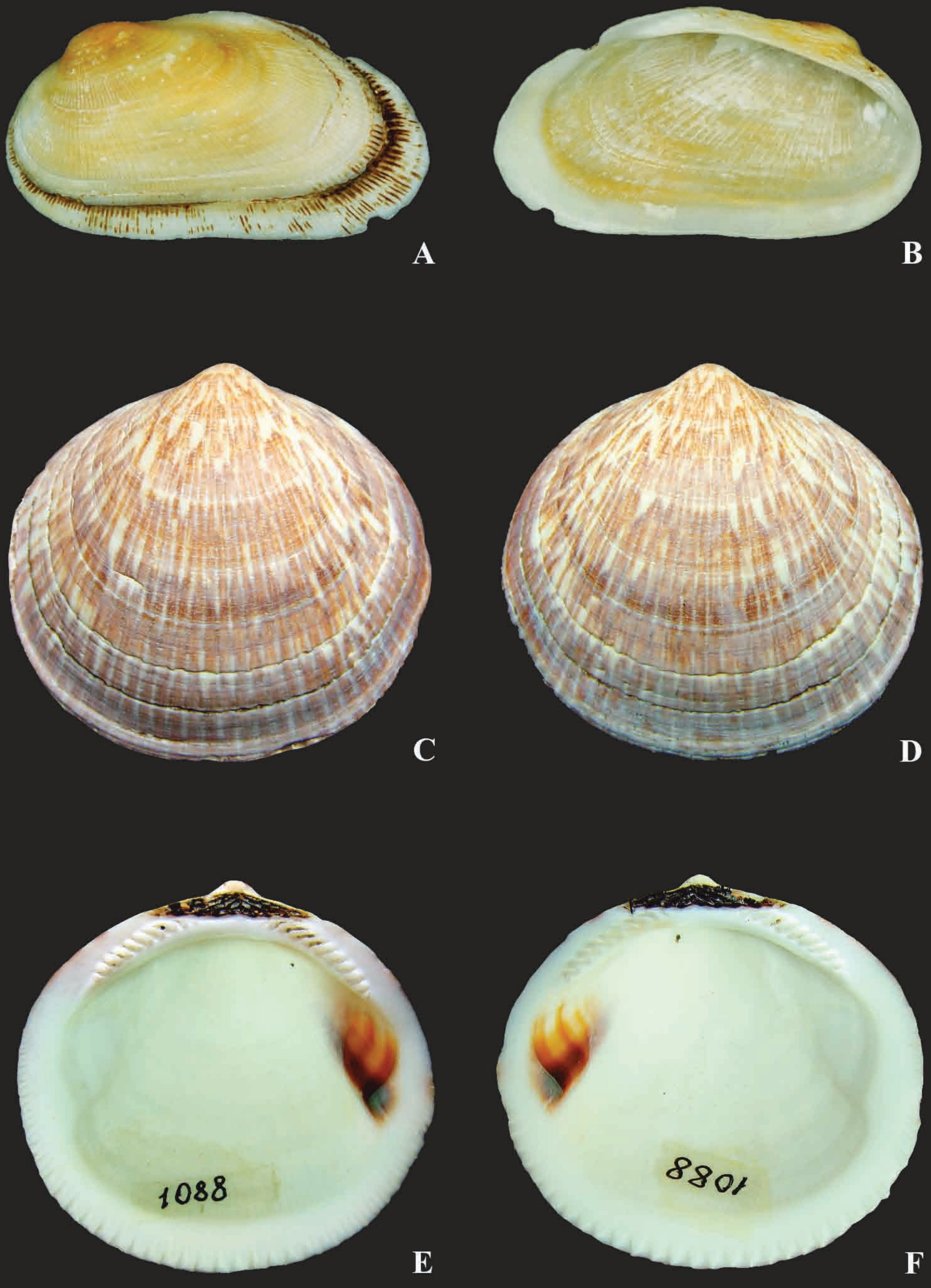
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Plate 8

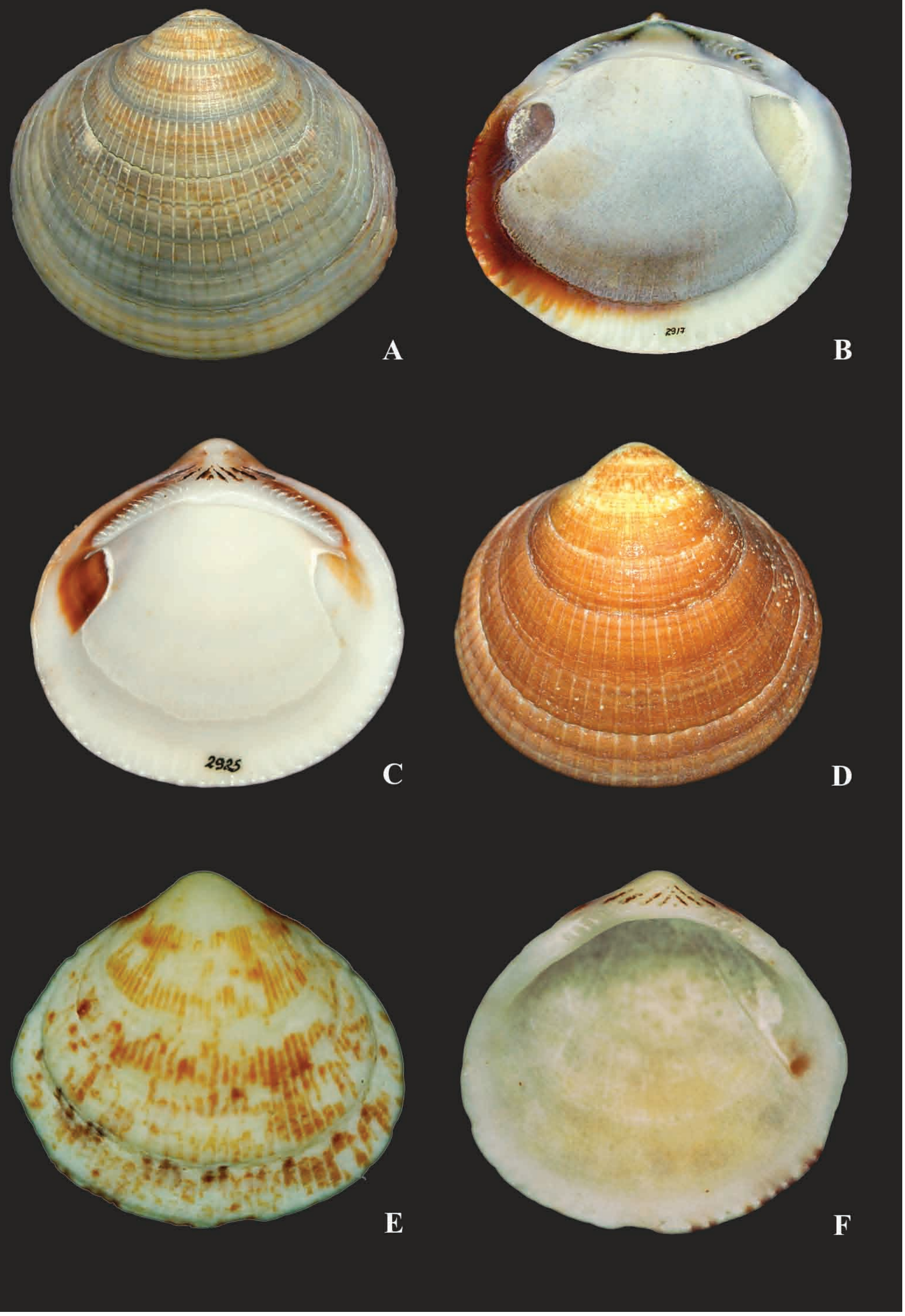
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Plate 9

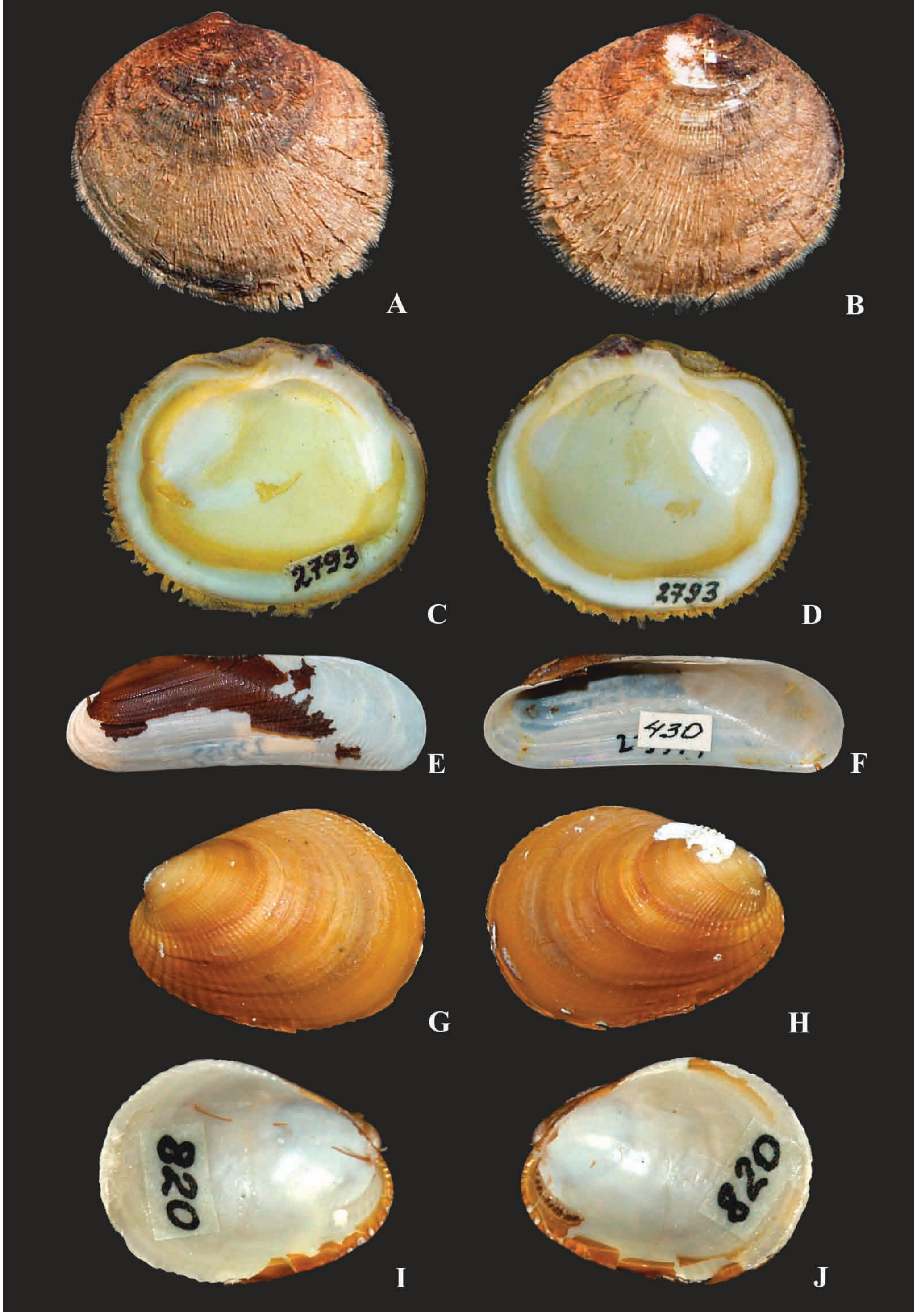
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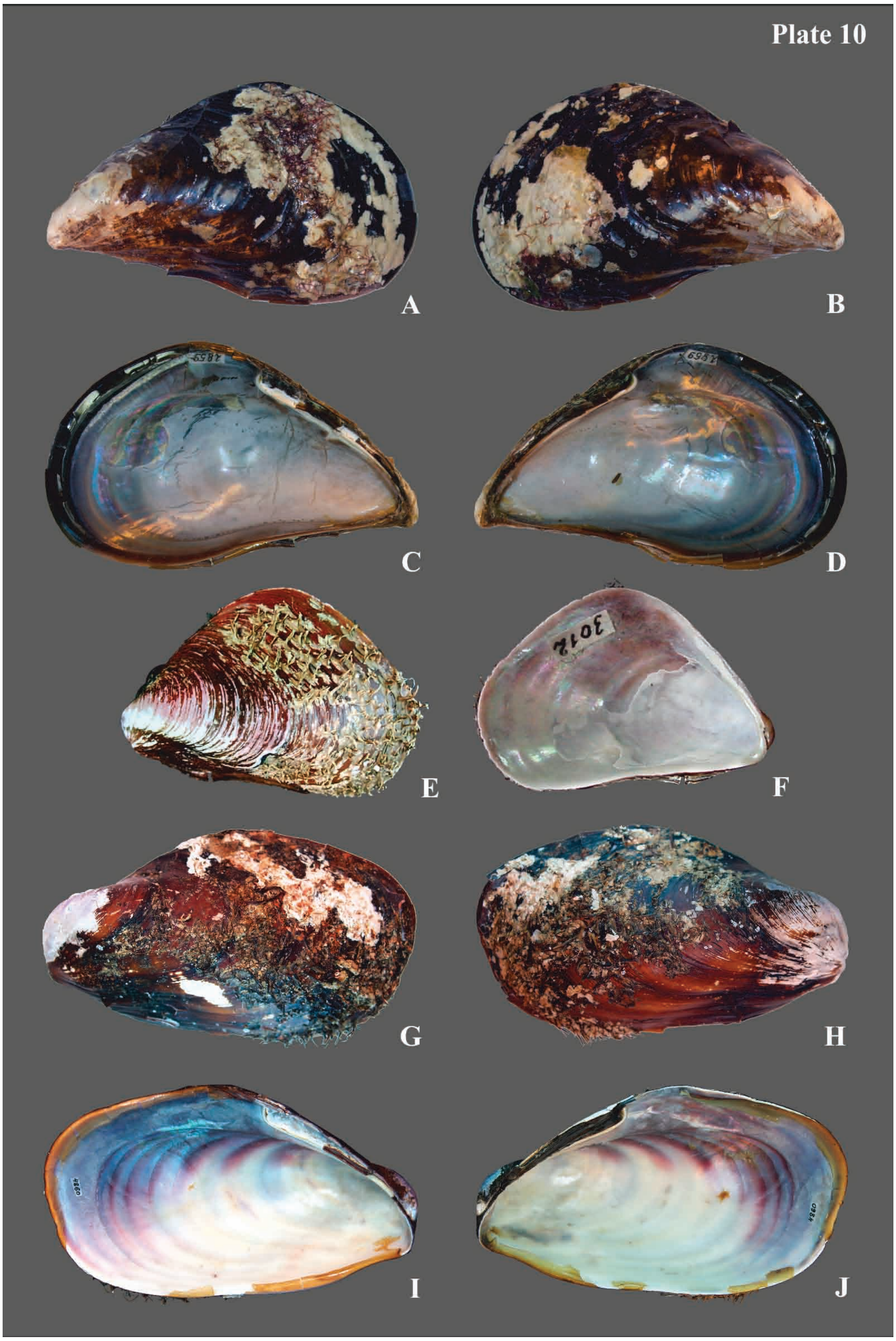
Plate 10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Explanations of Plates 11–15

Plate 11

Figs. A, B. *M.* (*M.*) *auriculatus* (Krauss, 1848). **SK**: Yeongil Bay, depth 25 m, length 9.9 mm, ZMFU 19319/Bv-2812.
Figs. C, D. *Lithophaga* (*Leiosolenus*) *curta* (Lischke, 1874). **SK**: Yeongil Bay, depth 25 m, length 8.5 mm, ZMFU 20563/Bv-3300.
Figs. E, F. *Musculista senhousia* (Benson in Kantor, 1842). **SP**: Possjet Bay, Ekpeditsii Bay, Churkhado (Nazimova) Spit, length 19.8 mm, ZMFU 9917/Bv-436.
Figs. G–J. *Septifer* (*Mytilisepta*) *keenae* Nomura, 1936. **SP**: Possjet Bay, Reid Pallada Bay, length 19.8 mm, ZMFU 17879/Bv-2478.
Figs. K–N. *Septifer* (*Mytilisepta*) *virgatus* (Wiegmann, 1837). **SK**: Gangwon Province, Kallam Village, length 34.6 mm, ZMFU 19046/Bv-2626.
Figs. O, P. *Vilasina decorata* (A. Adams, 1862). **SK**: Yeongil Bay, depth 25 m, length 3.3 mm, ZMFU 20562/Bv-3299.
Figs. Q, R. *Vilasina pillula* Scarlato, 1960. **SP**: Peter the Great Bay, Klerka Peninsula, length 6.2 mm, ZMFU 11250/Bv-1326.

Plate 12

Figs. A–D. *Musculus discors* (L., 1767). **SP**: Peter the Great Bay, length 37.1 mm, ZMFU 25061/Bv-4126.
Fig. E. *Musculus glacialis* (Leche, 1883). **SP**: Peter the Great Bay, length 9.7 mm, ZMFU 25060/Bv-4125.
Figs. F–I. *Musculus koreanus* Ockelmann, 1983: **SP**: Peter the Great Bay, length 33.5 mm, ZMFU 20389/Bv-3230.

Plate 13

Figs. A, B. *Musculus laevigatus* (Gray, 1824). **MNP**: near Cape Sosunova, depth 54 m, length 62.6 mm, ZMFU 19651/Bv-2944.
Figs. C, D. *Musculus niger* (Gray, 1824). **SP**: Peter the Great Bay, depth 71 m, length 62.1 mm, ZMFU 18311/Bv-2533.
Figs. E–H. *Mytilus* (*Mytilus*) *coruscus* Gould, 1861. **SK**: Gyeongbuk Province, around Hupo Bay, length 95.1 mm, ZMFU 19412/Bv-2883.
Figs. I–L. *M.* (*M.*) *coruscus* Gould, 1861. **SP**: Peter the Great Bay, Putyatina Is., length 69.5 mm, ZMFU 28552/Bv-4859.

Plate 14

Figs. A–D. *Mytilus* (*Mytilus*) *trossulus* A.A. Gould, 1850. **SP**: Peter the Great Bay, south-western part, Cape Ostrovok Falshivy, length 49.6 mm, ZMFU 9788/Bv-385.
Figs. E–H. *M.* (*M.*) *trossulus* A.A. Gould, 1850. **MNP**: Kievka Bay, length 39.9 mm, ZMFU 25025/Bv-4111.
Figs. I–L. *M.* (*M.*) *trossulus* A.A. Gould, 1850. **SP**: Peter the Great Bay, south-western part, Furugelma Is., Zapadnaya Bay, length 49.6 mm, ZMFU 19057/Bv-2637.

Plate 15

Figs. A–D. *M.* (*M.*) *galloprovincialis* Lamarck, 1819. **SP**: Peter the Great Bay, Bolshoy Pelis Is., length 71.6 mm, ZMFU 9813/Bv-400.
Figs. E–H. *M.* (*M.*) *galloprovincialis* Lamarck, 1819. **SK**: Gangwon Province, Kallam Village, length 35.2 mm, ZMFU 19058/Bv-2638.
Figs. I–J. *Limaria* (*Limaria*) *hakodatensis* (Tokunaga, 1906). **SK**: Yeongil Bay, height 18.6 mm, ZMFU 19343/Bv-2819.

Plate 11

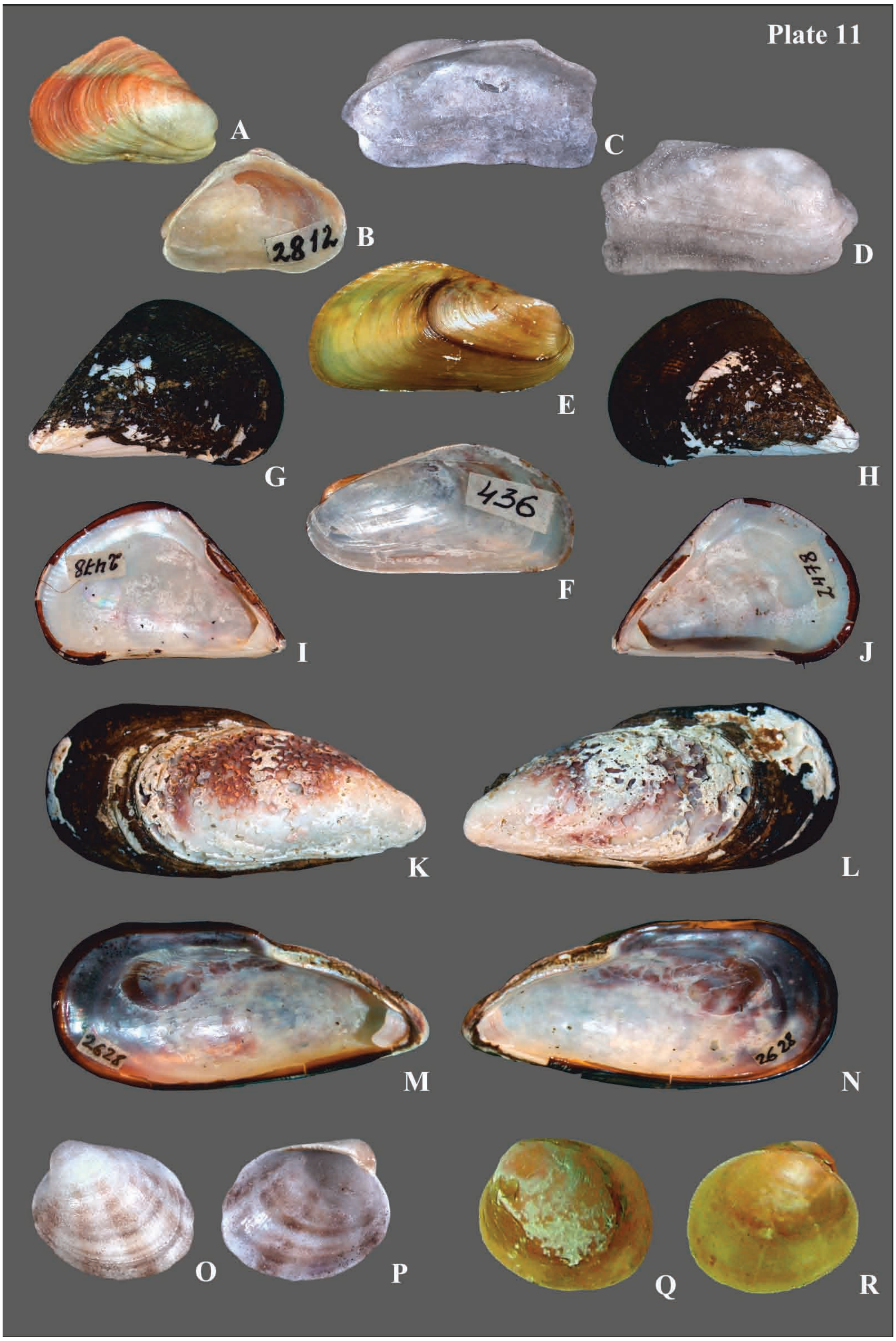
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Plate 12

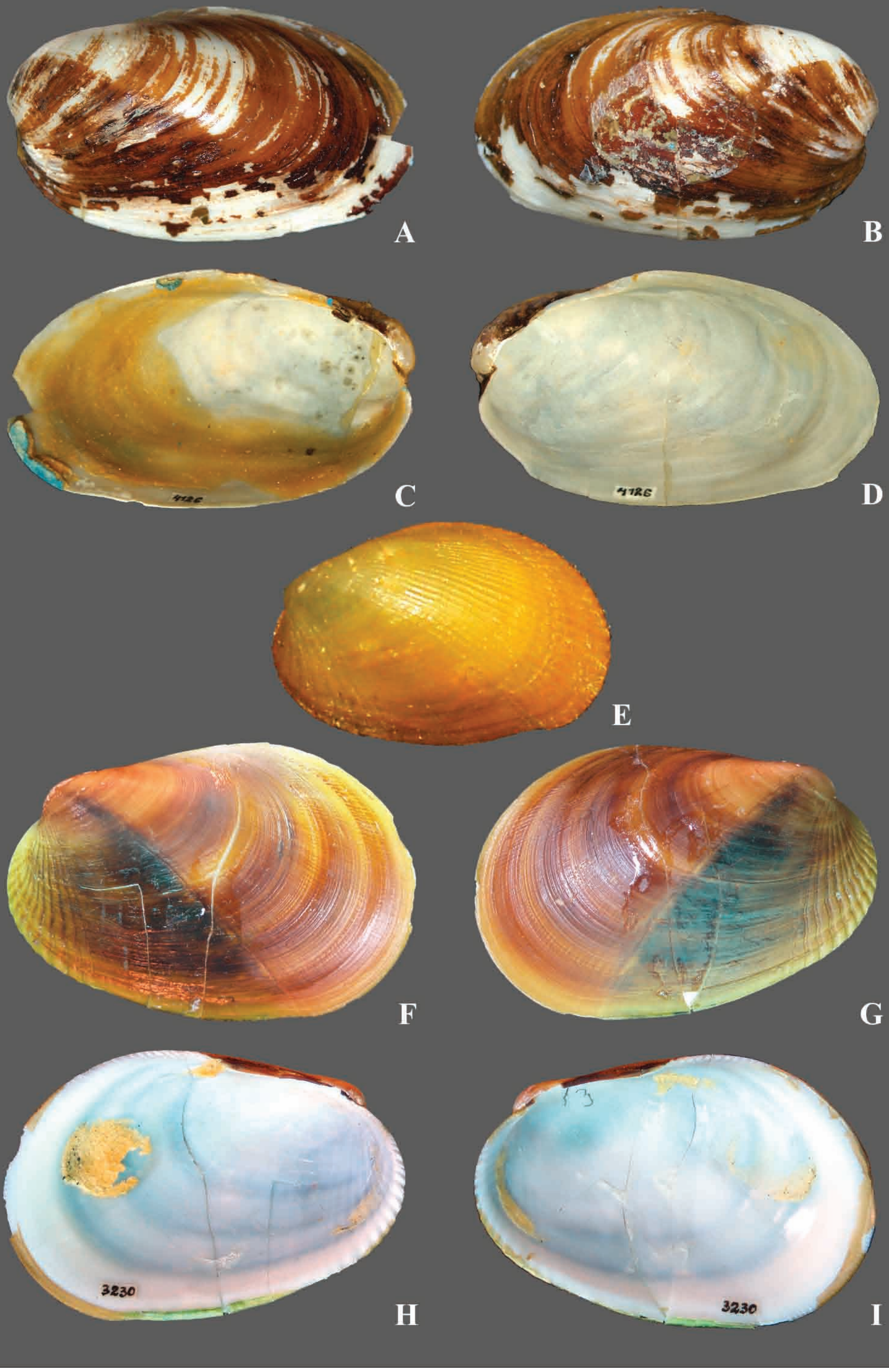
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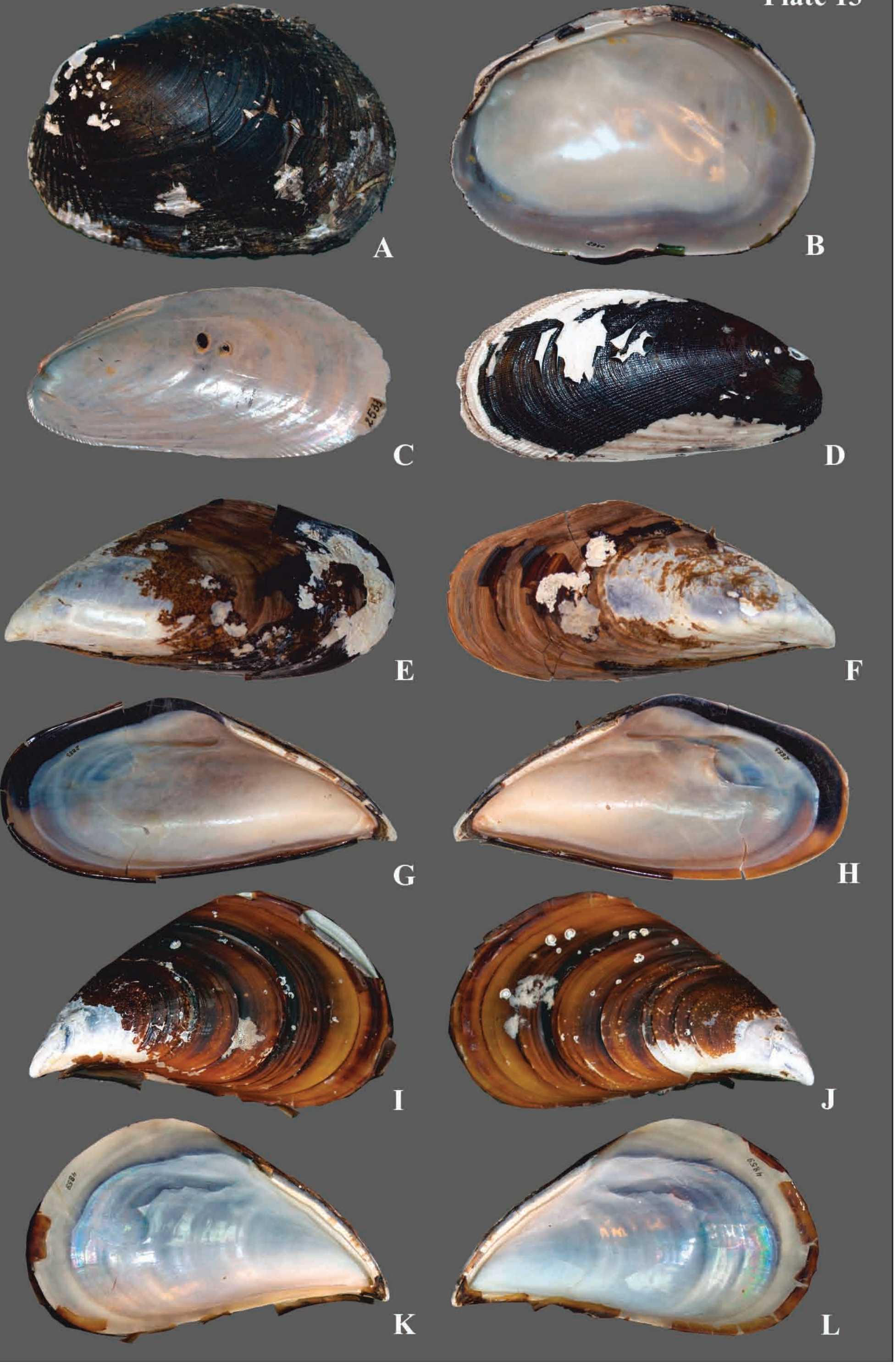
Plate 13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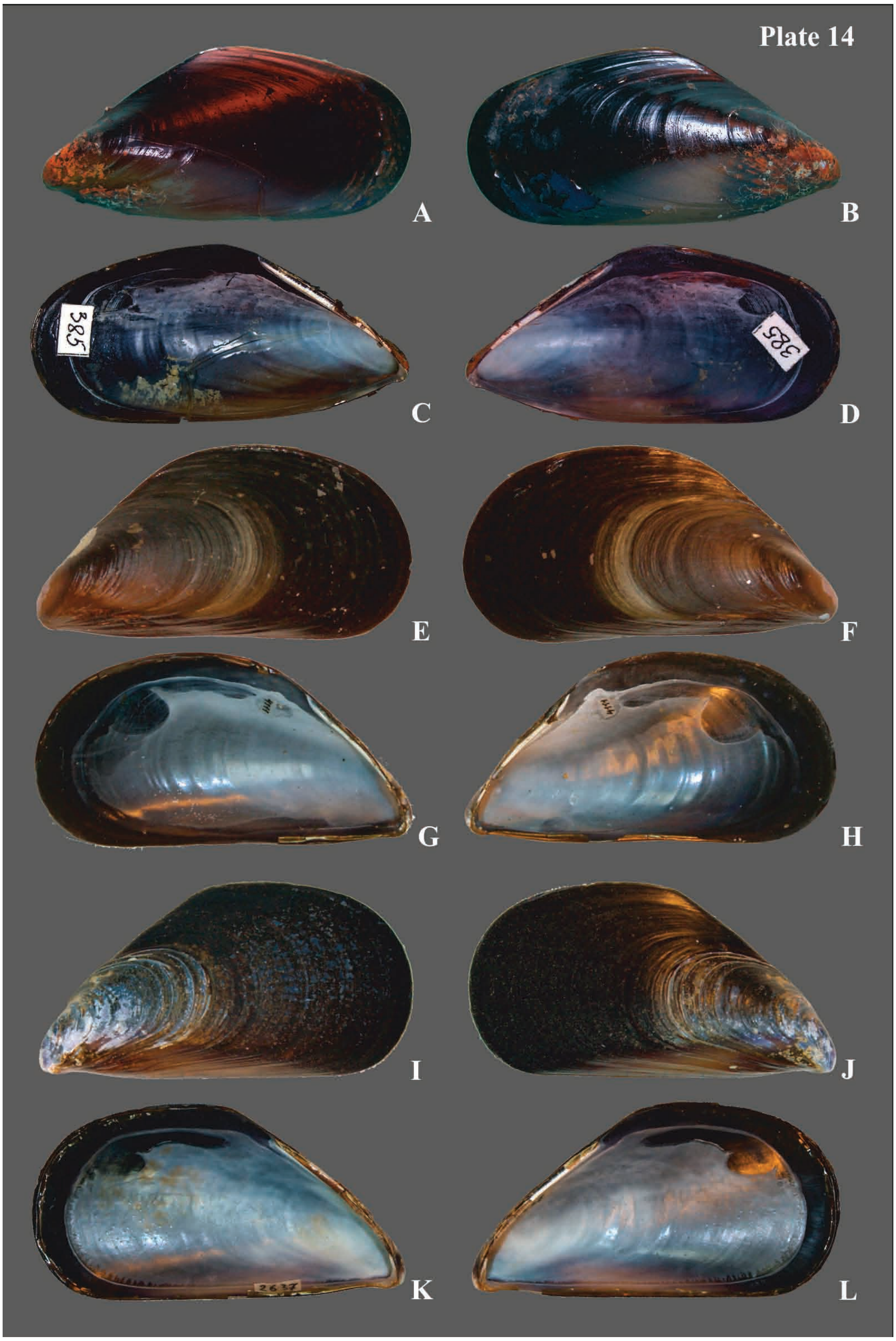
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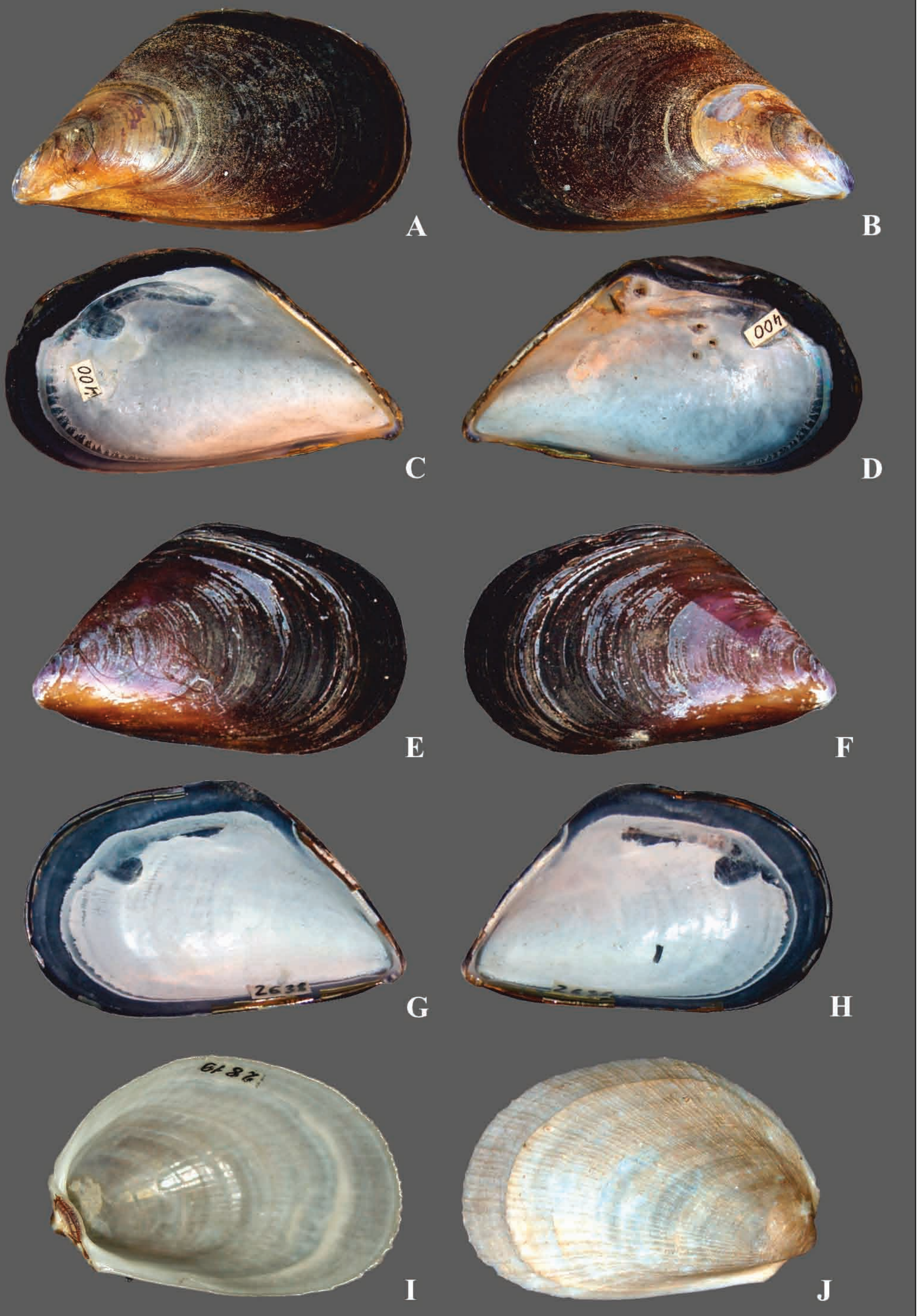
Plate 15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Explanations of Plates 16–20

Plate 16

Figs. A–D. *Crassostrea gigas* (Thunberg, 1793). **SP**: Peter the Great Bay, Russky Is., height 165 mm, ZMFU 25833/Bv-4331.

Figs. E–F. *C. gigas* (Thunberg, 1793). **SK**: Busan, Gwangalli Beach, height 92 mm, RGN collection.

Figs. G–H. *Crassostrea nippona* (Seki, 1934). **SK**: Gangwon Province, Kallam Village, height 88.1 mm, ZMFU 19042/Bv-2622.

Plate 17

Figs. A, B. ?*Crassostrea* sp. **SK**: Busan, Gwangalli Beach, height 61 mm, RGN collection.

Figs. C, D. *Ostrea denselamellosa* Lischke, 1869. **SK**: Busan, Songyeong Beach, height 36 mm, RGN collection.

Figs. E, F. *Parahyotissa* cf. *inaequivalvis* (Sowerby II, 1871). **SK**: Busan, Songyeong Beach, height 43 mm, RGN collection.

Figs. G, H. *Chlamys* (*Azumapecten*) *squamata* (Gmelin, 1791). **SK**: Busan, Haeundae Beach, length 37.2 mm, ZMFU 28789/Bv-4908.

Plate 18

Figs. A–D. *Mizuhopecten yessoensis* (Jay, 1857). **SP**: Possjet Bay, length 137.9 mm, ZMFU 17522/Bv-2413.

Figs. E–H. *Chlamys* (*Swiftopecten*) *swiftii* (Bernardi, 1858). **SP**: Peter the Great Bay, Rikorda Is., length 90.6 mm, ZMFU 10258/Bv-647.

Plate 19

Figs. A–D. *Chlamys* (*Azumapecten*) *farreri* (Jones et Preston, 1904). **SP**: Possjet Bay, length 104.9 mm, ZMFU 22473/Bv-3549.

Figs. E–H. *Chlamys* (*Chlamys*) *behringiana* (Middendorff, 1849). **MNP**: Nerpa Bay, depth 60 m, length 44 mm, ZMFU 10296/Bv-679.

Plate 20

Figs. A–D. *Chlamys* (*Chlamys*) cf. *chosenica* Kuroda, 1932. **MNP**: west of Cape Kril'on, depth 89 m, length 61.8 mm, ZMFU 27553/Bv-4613.

Figs. E, F. *Chlamys* (*Scaeochlamys*) *irregularis* (Sowerby II, 1842). **SK**: Busan, Haeundae Beach, height 19 mm, RGN collection.

Figs. G, H. *Chlamys* (*Coralichlamys*) cf. *empressae* Kuroda et Habe in Kuroda, Habe et Oyama, 1971. **SK**: Busan, Songyeong Beach, height 16 mm, RGN collection.

Plate 16

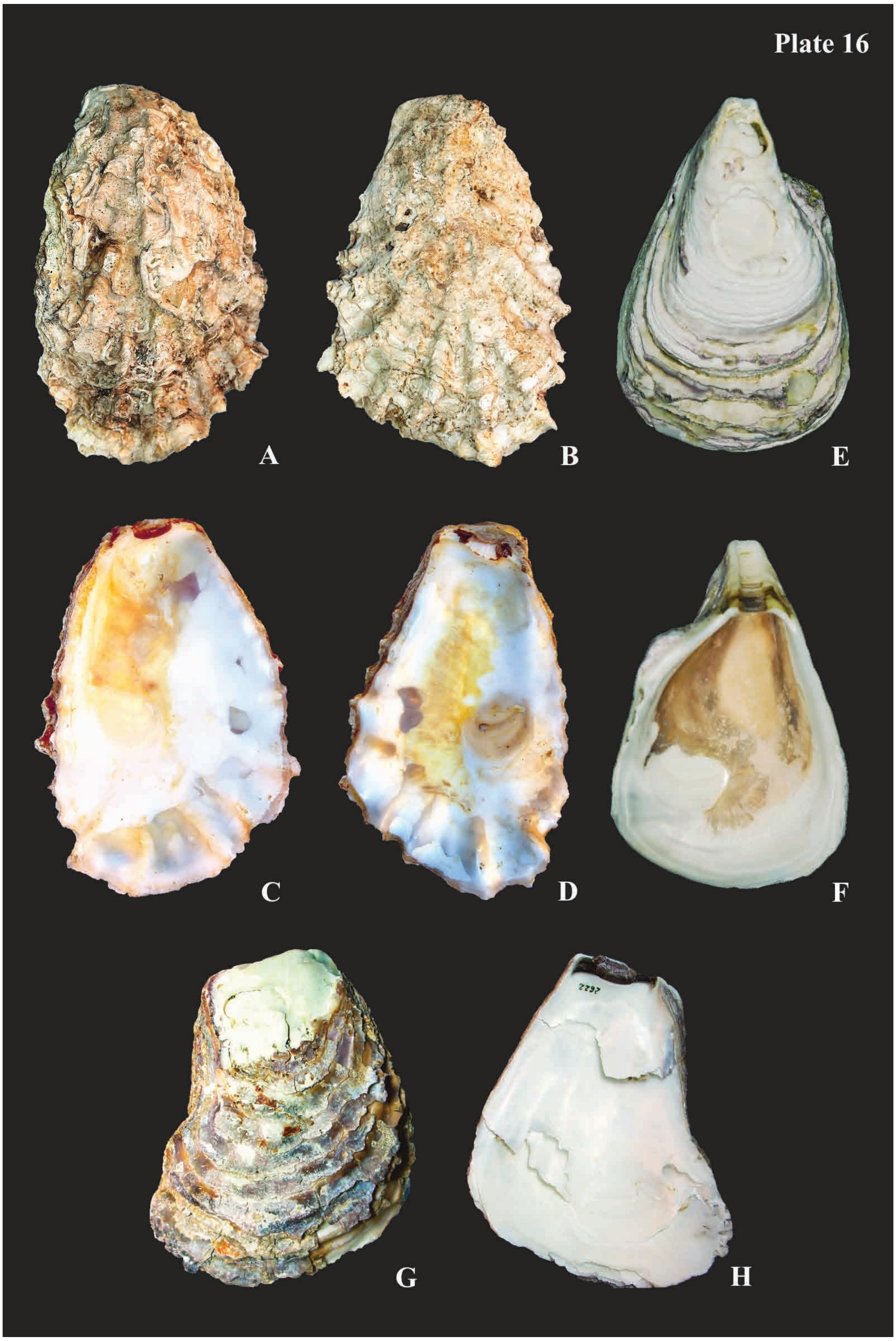

Plate 17

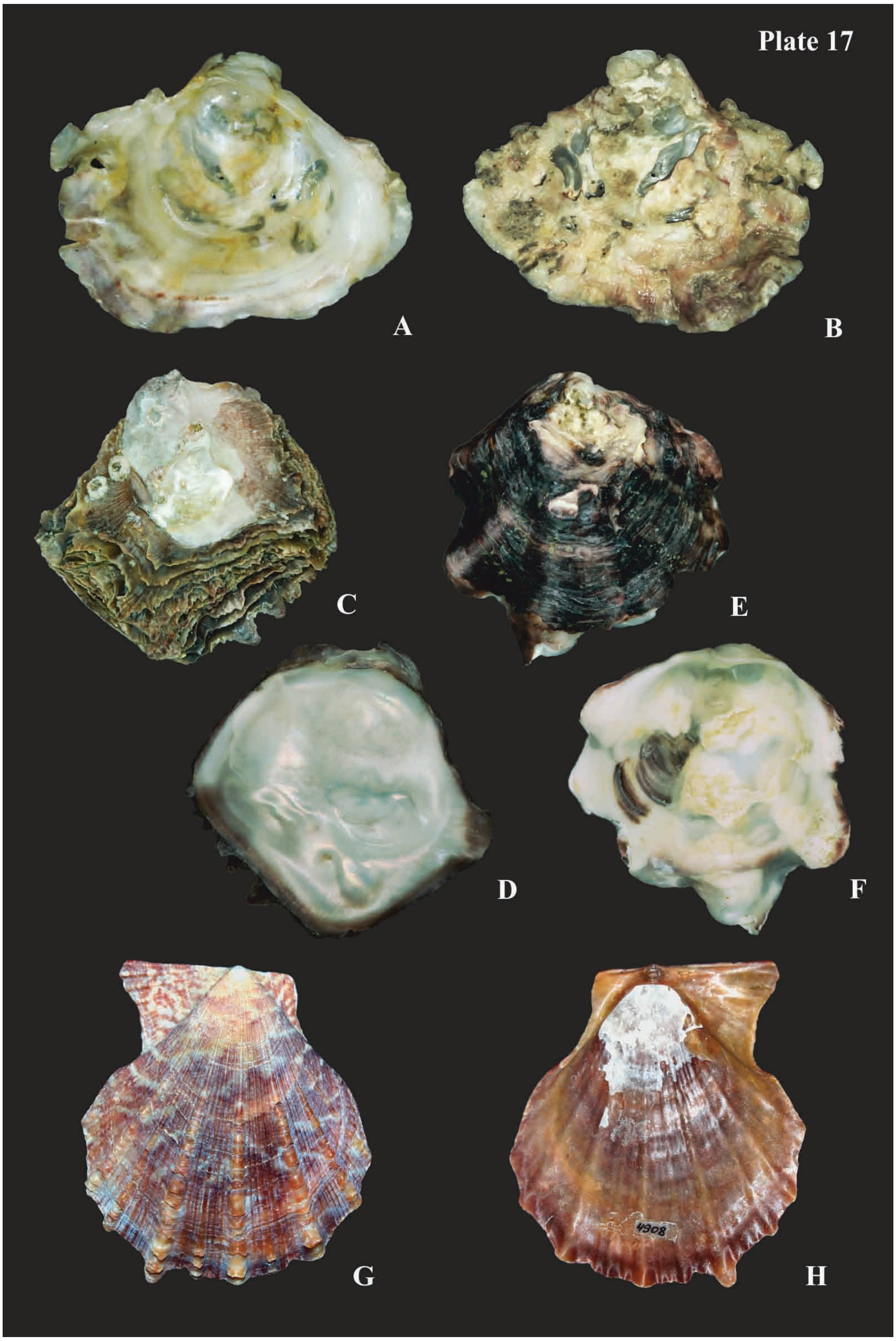
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Plate 18

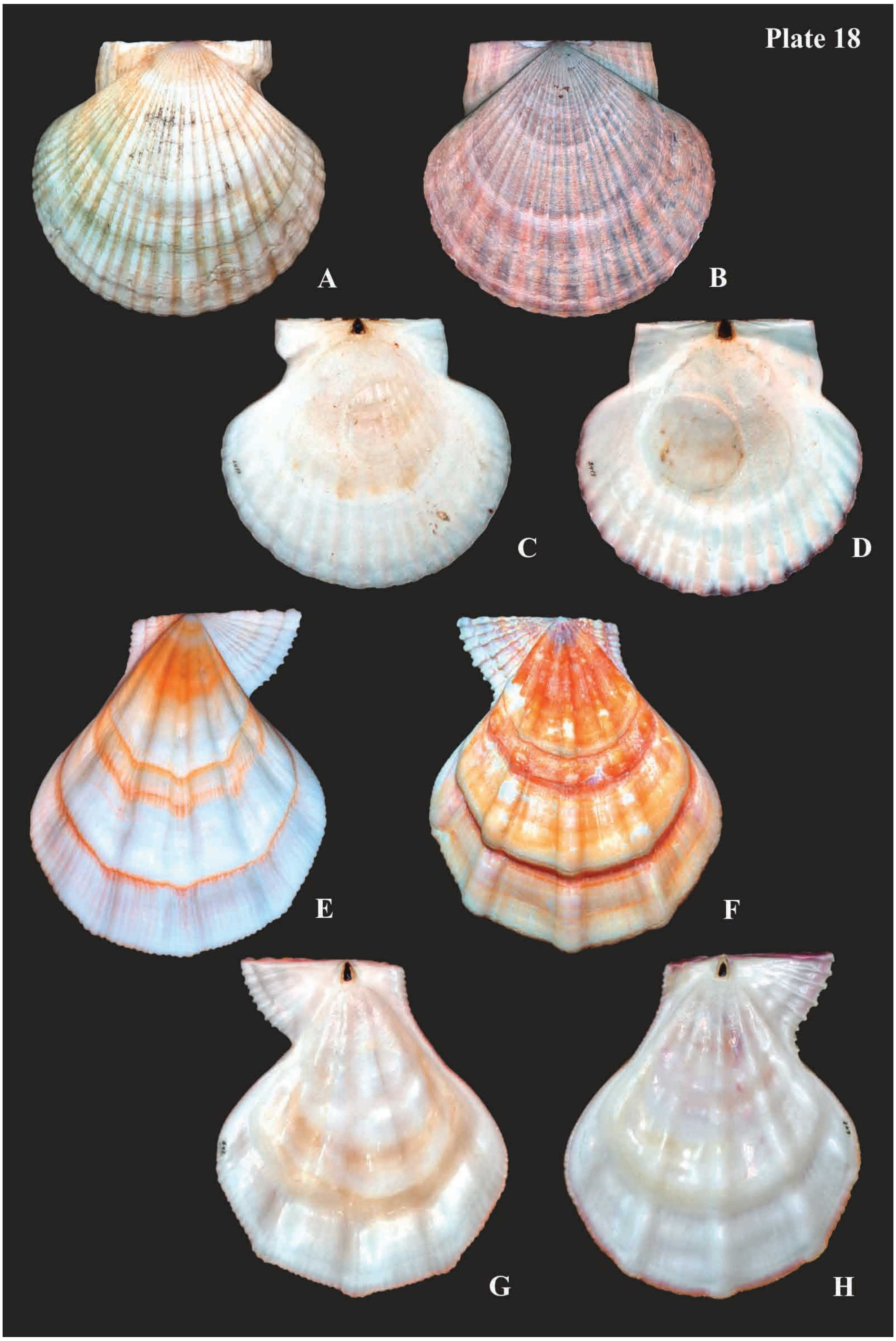

Plate 19

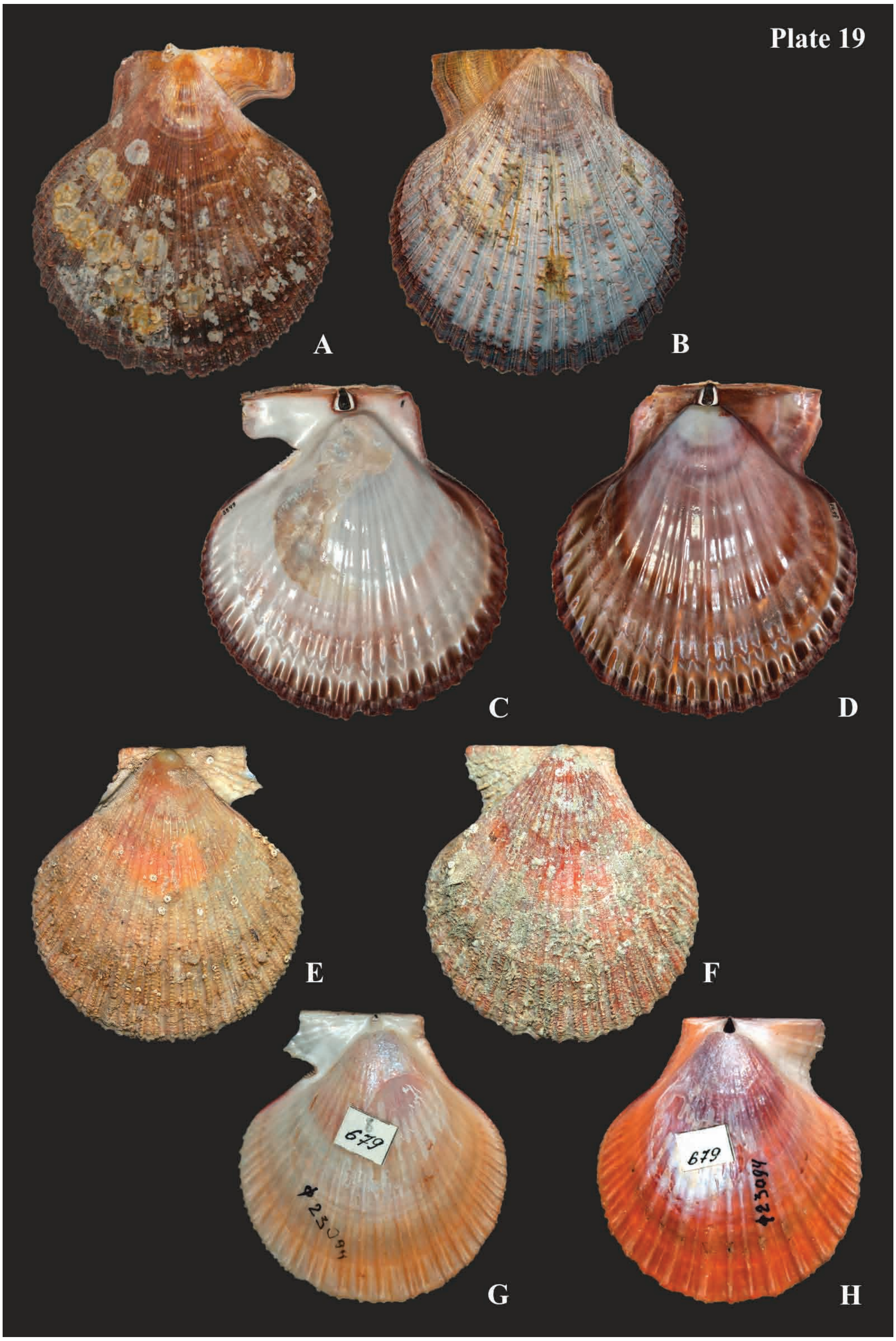
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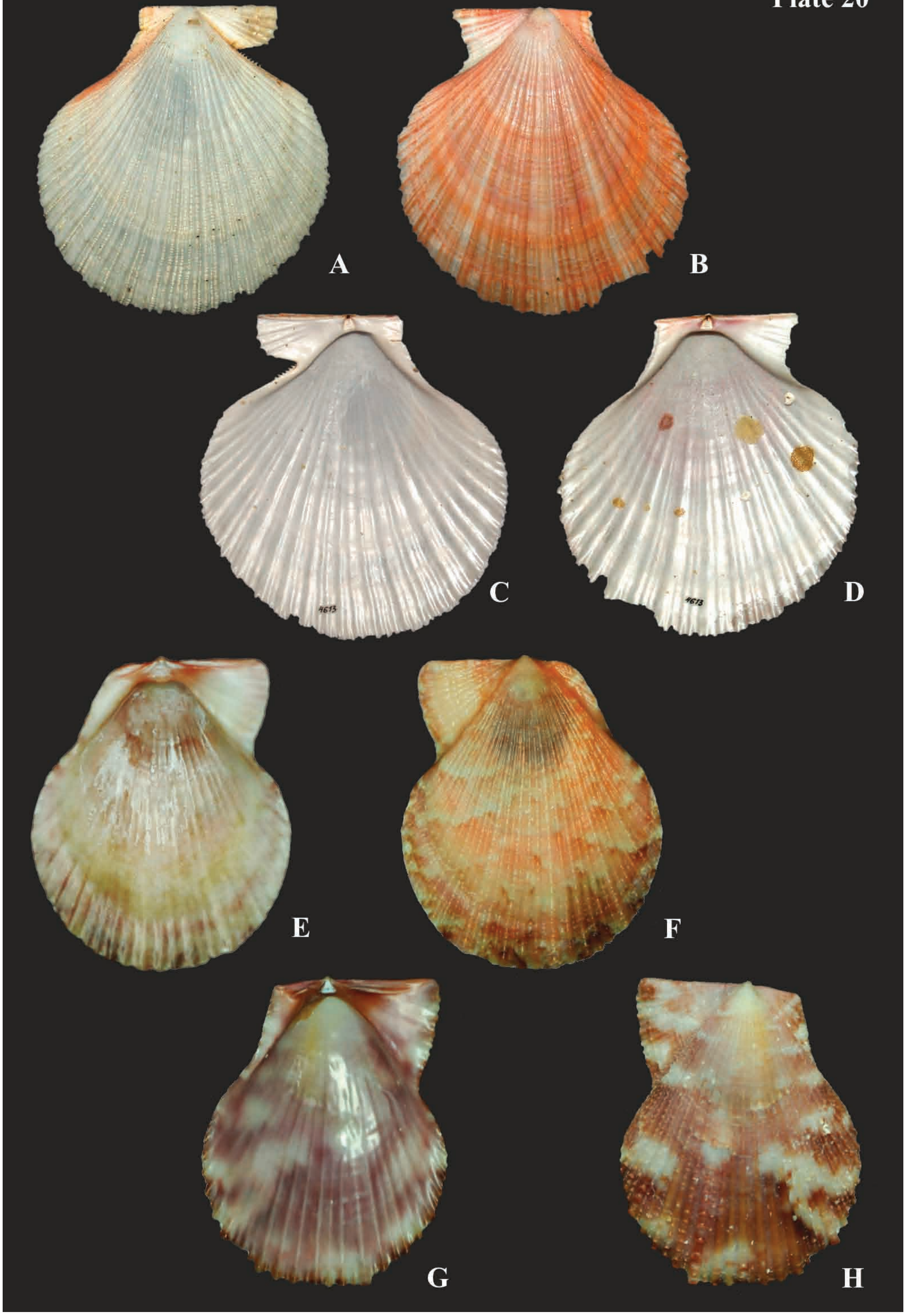
Plate 20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Explanations of Plates 21–25

Plate 21

Figs. A, B. *Chlamys* (*Azumapecten*) *lemniscata* (Reeve, 1853). **SK**: Busan, Haeundae Beach, length 21 mm, RGN collection.

Figs. C, D. *Pecten* (*Notovola*) *albicans* (Schröter, 1802). **SK**: Yeongil Bay, depth 50–52 m, length 18.5 mm, ZMFU 19304/Bv-2797.

Figs. E–H. *Argopecten irradians* (Lamarck, 1819). **SK**: Busan, length 57.8 mm, ZMFU 22617/Bv-3573.

Plate 22

Figs. A–D. *Parvamussium alaskense* (Dall, 1871). **MNP**: Ezhovaya Bay, depth 96 m, length 30.2 mm, ZMFU 20951/Bv-3382.

Figs. E–H. *P. alaskense* (Dall, 1871). **MNP**: Svetlaya Bay, off Cape Sosunova, depth 199 m, length 26 mm, ZMFU 19189/Bv-2734.

Plate 23

Figs. A, B. *Spondylus* (*Spondylus*) *cruentus* Lischke, 1868. **SK**: Busan, Songyeong Beach, height 33 mm, RGN collection.

Figs. C–F. *Pododesmus* (*Monia*) *macrochisma* (Deshayes, 1839). **MNP**: Dzhigit Bay, depth 125 m, length 62 mm, ZMFU 19377/Bv-2848.

Figs. G–H. *Anomia chinensis* Philippi, 1849. **SK**: Gangwon Province, between Cape Sachondan and Yongok River mouth, length 37.1 mm, ZMFU 19516/Bv-2928.

Figs. I–J. *Dimya japonica* Habe, 1971. **SK**: Jeonnam Province, Jindo Is., length 29.8 mm, ZMFU 23151/Bv-3750.

Plate 24

Figs. A, B. *Pillucina pisidium* (Dunker, 1860). **SP**: Ussuriysky Bay, Gornostay Bay, length 7.9 mm, ZMFU 10351/Bv-727.

Figs. C, D. *Phlyctiderma japonicum* (Pilsbry, 1895). **SK**: Yeongil Bay, length 14.9 mm, ZMFU 19308/Bv-2801.

Figs. E–H. *Felaniella usta* (Gould, 1861). **SP**: Peter the Great Bay, Patrokl Bay, length 23.3 mm, ZMFU 15587/Bv-2033.

Figs. I, J. *Felaniella ohtai* Kase et Miyauchi in Kase, Miyauchi et Amano, 1996. **SP**: Nakhodka Bay, length 30.8 mm, ZMFU 22662/Bv-3611.

Figs. K, L. *Cycladicama cumingii* (Hanley, 1844). **SK**: Yeongil Bay, depth 19 m, length 21.5 mm, ZMFU 19318/Bv-2811.

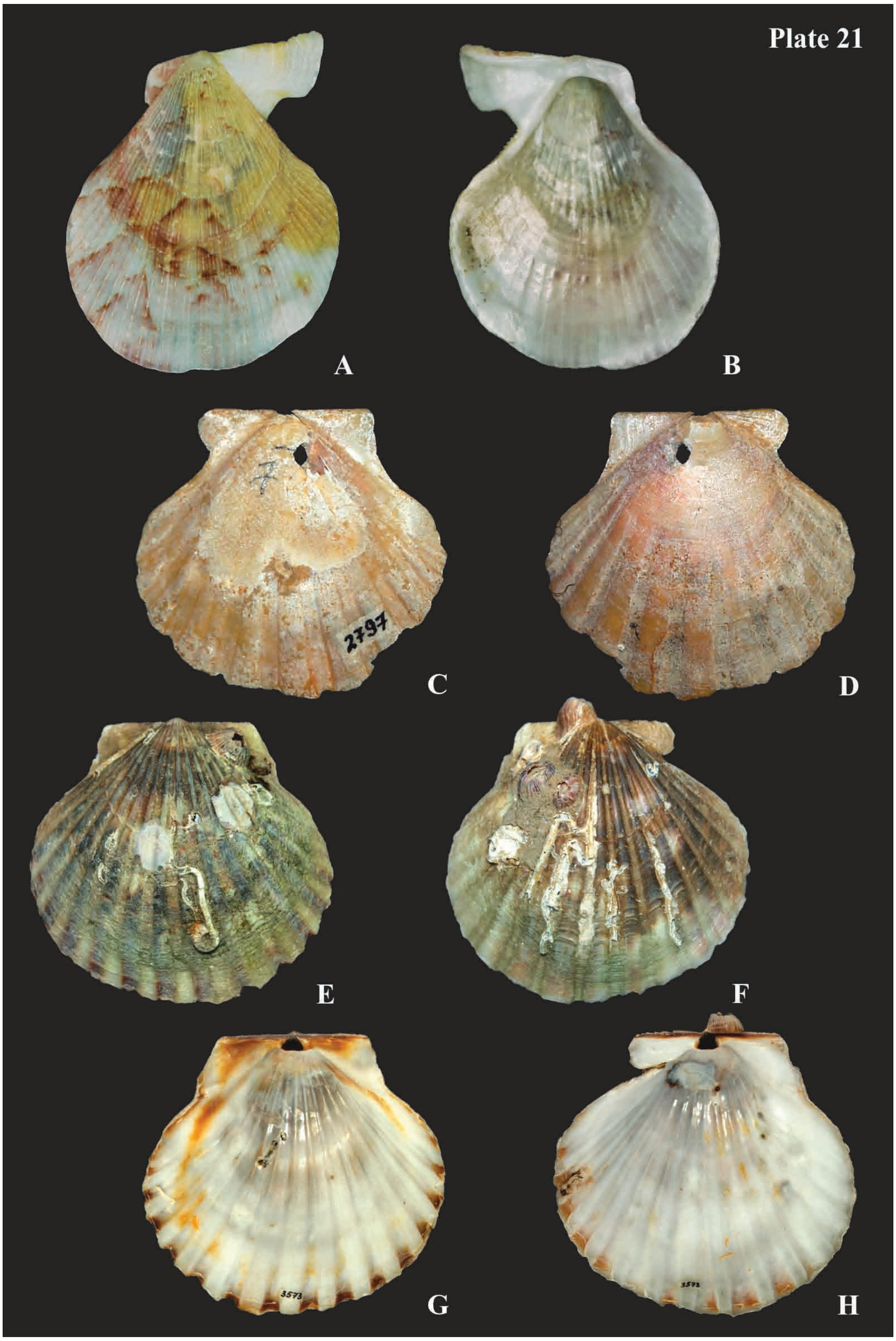
Plate 25

Figs. A–D. *Diplodonta semiasperoides* Nomura, 1932. **SP**: Possjet Bay, Vityaz Bay, length 27.2 mm, ZMFU 23314/Bv-3789.

Figs. E, F. *Axinopsida subquadrata* (A. Adams, 1862). **SP**: Amursky Bay, depth 21 m, length 3.2 mm, ZMFU 27819/Bv-4738.

Figs. G–J. *Conchocele bisecta* (Conrad, 1849). **SP**: Possjet Bay, subtidal, length 22.3 mm, ZMFU 10845/Bv-1082.

Plate 21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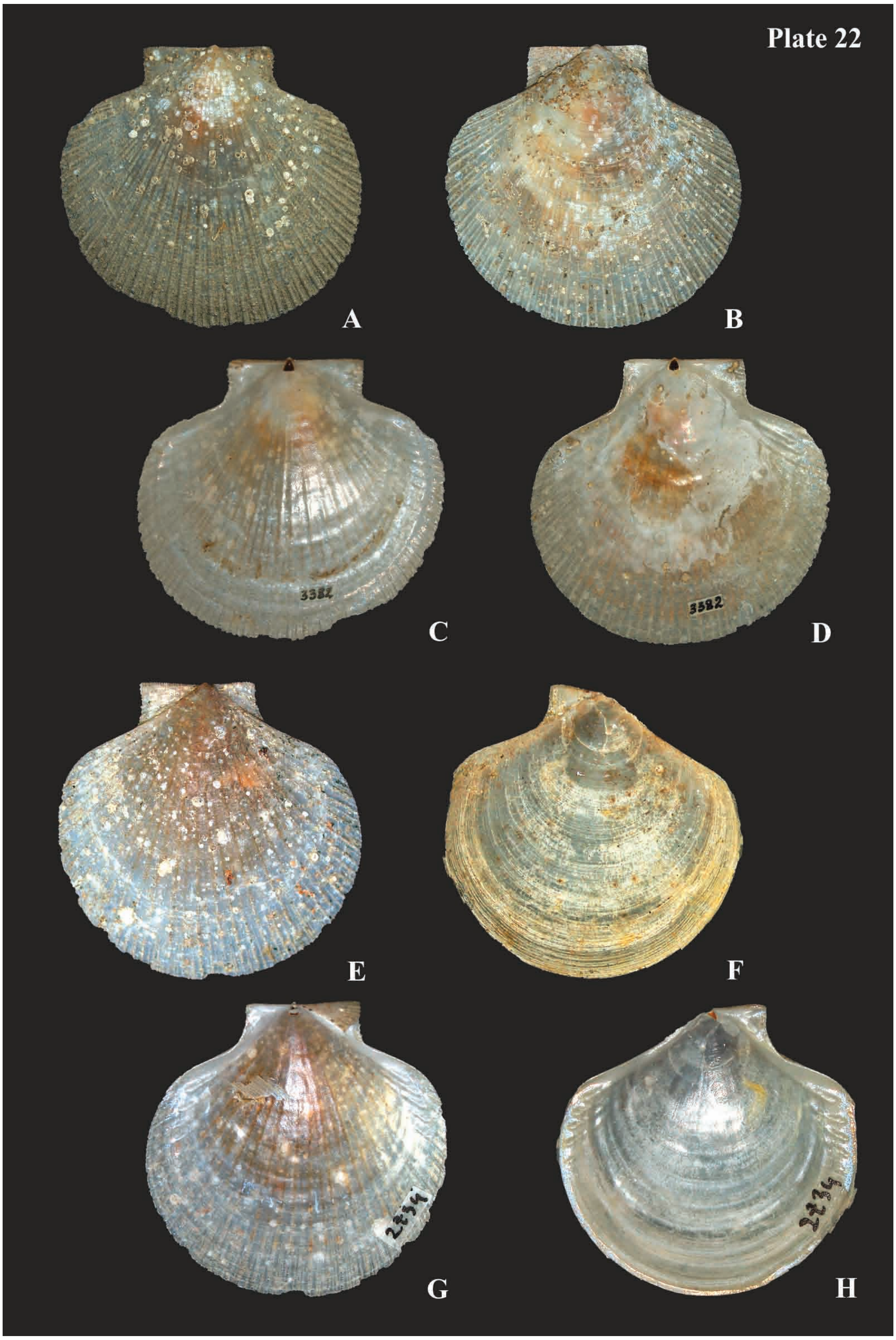
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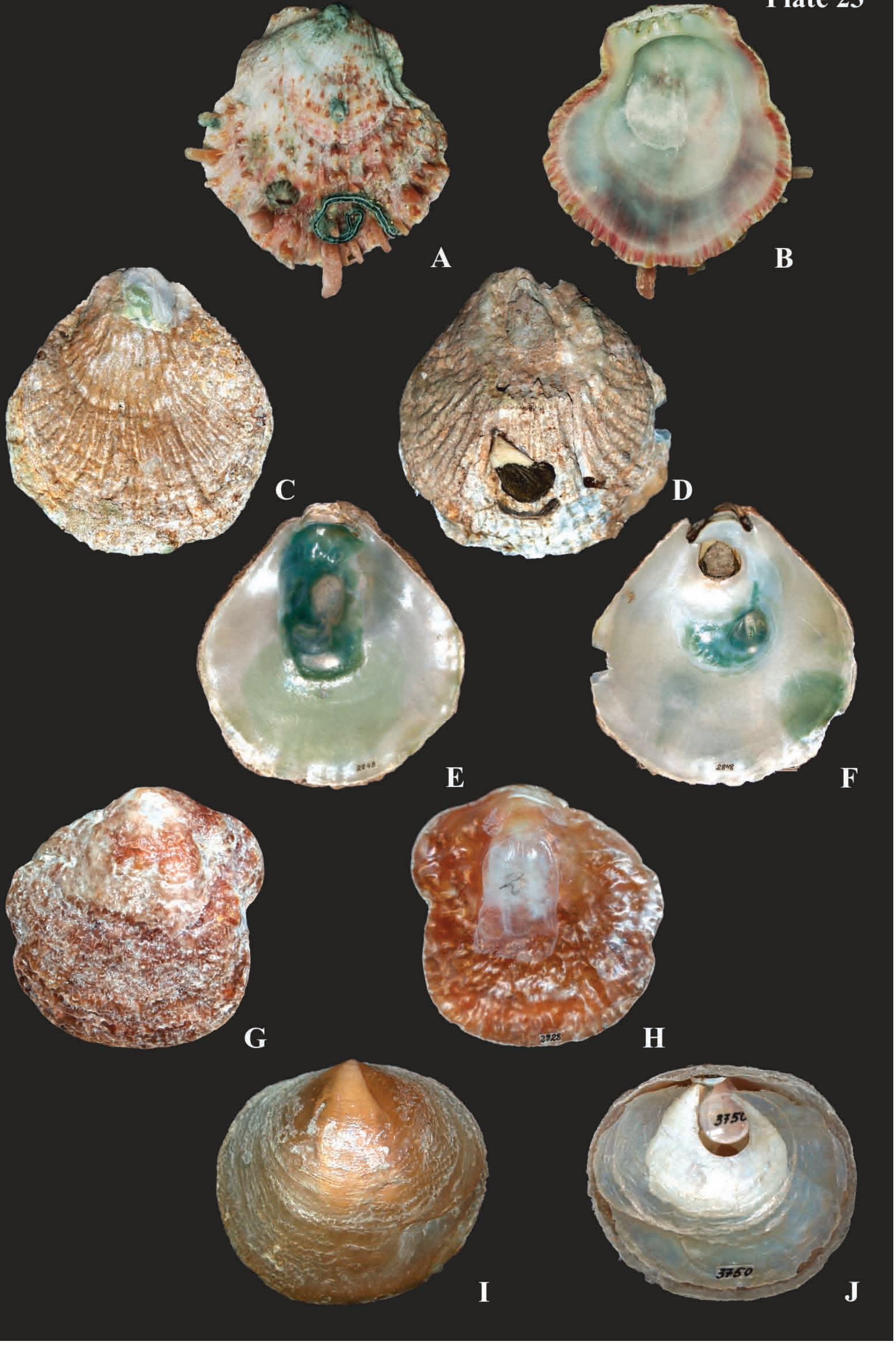
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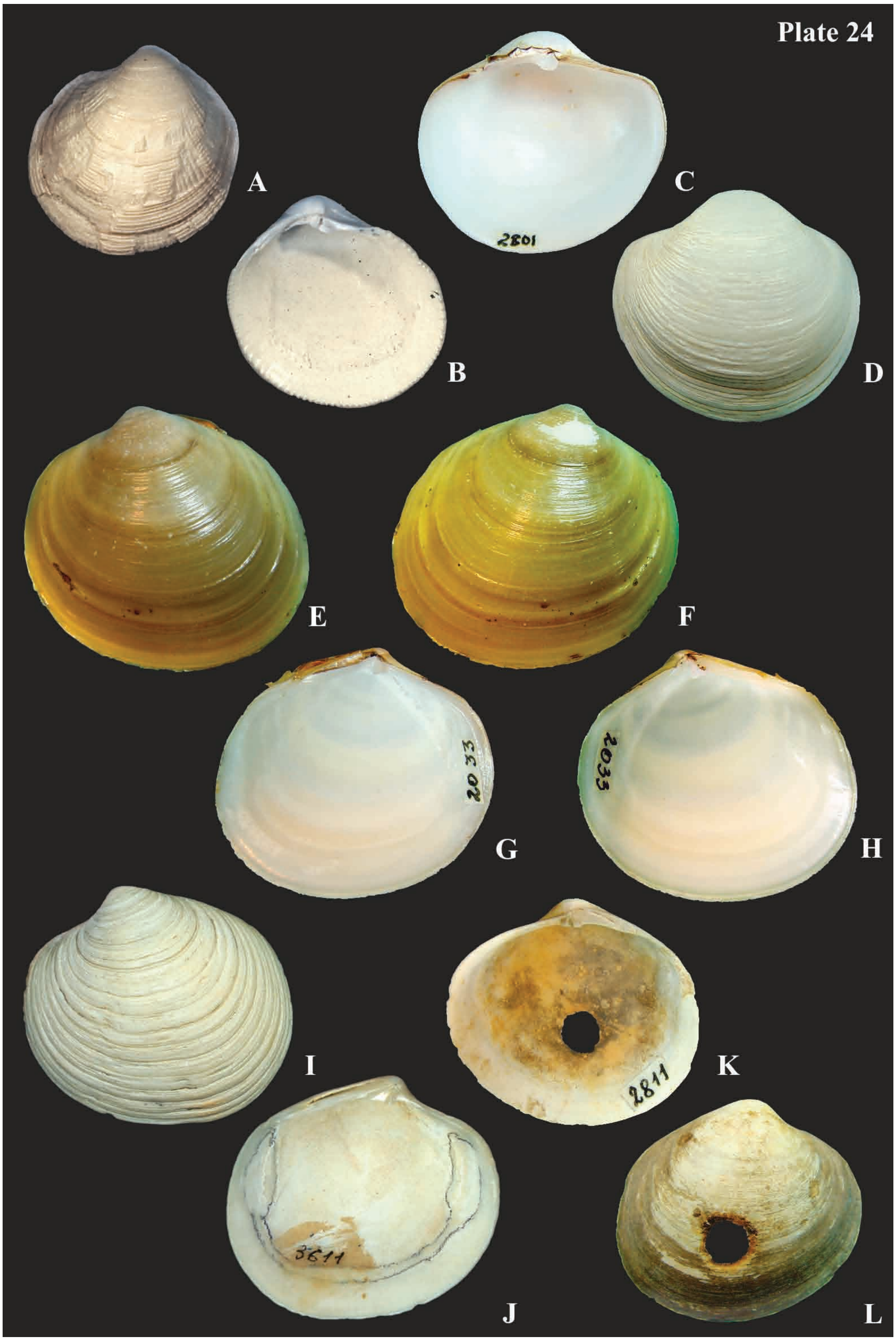

Plate 24

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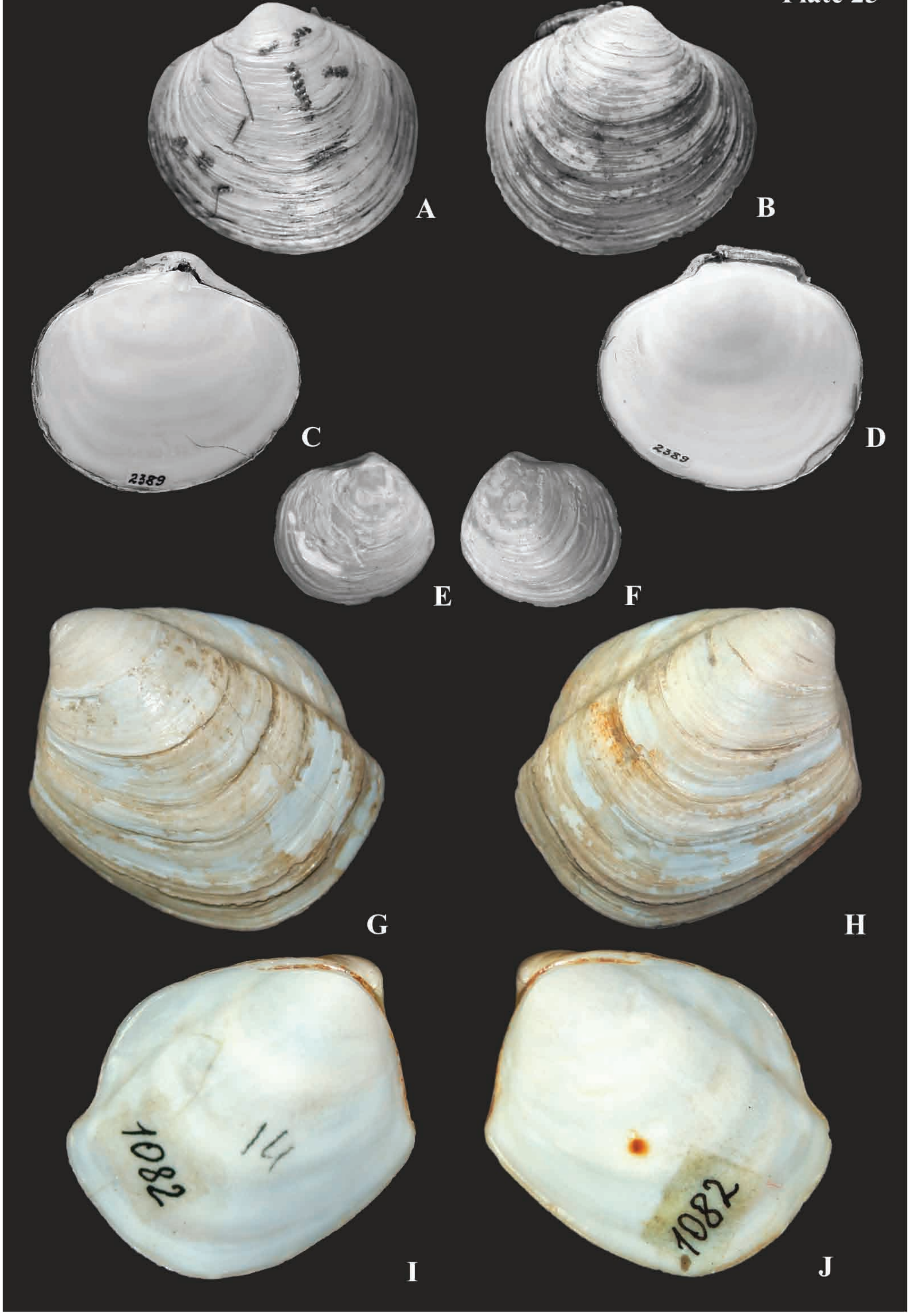
Plate 25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Explanations of Plates 26–30

Plate 26

Figs. A, B. *C. bisecta* (Conrad, 1849). **SP**: Peter the Great Bay, depth 130 m, length 109.5 mm, ZMFU 14973/Bv-1936.

Figs. C–F. *Astarte hakodatensis* Yokoyama 1920. **SK**: Yeongil Bay, depth 25 m, length 13 mm, ZMFU 19286/Bv-2779.

Figs. G–J. *Astarte montagui* (Dillwyn, 1817). **MNP**: Kievka Bay, depth 69 m, length 21.4 mm, ZMFU 18313/Bv-2535.

Plate 27

Figs. A–D. *Astarte borealis* (Schumacher, 1817). **SP**: Peter the Great Bay, off Cape Gamova, depth 155 m, length 41.4 mm, ZMFU 22985/Bv-3720.

Figs. E–H. *Astarte elliptica* (T. Brown, 1827). **SP**: Peter the Great Bay, off Cape Gamova, depth 155 m, length 30.4 mm, ZMFU 22982/Bv-3717.

Plate 28

Figs. A–D. *Salaputium* cf. *unicum* Hayami et Kase, 1993. **SK**: Yeongil Bay, depth 25 m, length 5.2 mm, ZMFU 19323/Bv-2816.

Figs. E, F. *Nipponocrassatella* sp. **SK**: Yeongil Bay, depth 21 m, length 13.8 mm, ZMFU 19344/Bv-2820.

Figs. G, H. *Indocrassatella* cf. *oblongata* (Yokoyama, 1920). **SK**: Yeongil Bay, depth 21 m, length 11.1 mm, ZMFU 19347/Bv-2823.

Figs. I–L. *Cyclocardia* (*Cyclocardia*) cf. *ferruginea* (Clessin, 1888). **MNP**: Cape Sayon, depth 50 m, length 7 mm, ZMFU 26457/Bv-4470.

Figs. M, N. *Megacardita coreensis* (Deshayes, 1854). **SK**: Yeongil Bay, depth 25 m, length 4.4 mm, ZMFU 20558/Bv-3296.

Plate 29

Figs. A–D. *Cyclocardia* (*Cyclocardia*) *rjabininae* (Scarlato, 1955). **SP**: Peter the Great Bay, off Cape Gamova, depth 250 m, length 21.5 mm, ZMFU 19367/Bv-2838.

Figs. E–H. *Cyclocardia* (*Crassicardia*) *crassidens* (Broderip et Sowerby I, 1829). **MNP**: off Cape Sosunova, depth 54 m, length 21.8 mm, ZMFU 19660/Bv-2953.

Figs. I, J. *Cardita leana* Dunker, 1860. **SK**: Busan, Haeundae Beach, length 20.9 mm, ZMFU 28794/Bv-4913.

Plate 30

Figs. A, B. *Chama fraga* Reeve, 1846. **SK**: Busan, Haeundae Beach, height 16 mm, RGN collection.

Figs. C–F. *Kellia japonica* Pilsbry, 1895. **MNP**: Udobnaya Bay, depth 78 m, length 13.1 mm, ZMFU 19665/Bv-2958.

Figs. G, H. *Nipponomysella obesa* Habe, 1960. **SK**: Yeongil Bay, depth 22.5 m, length 4 mm, ZMFU 20524/Bv-3274.

Figs. I, J. *Nipponomysella oblongata* (Yokoyama, 1922). **SK**: Yeongil Bay, depth 18.5 m, length 2.7 mm, ZMFU 20532/Bv-3282.

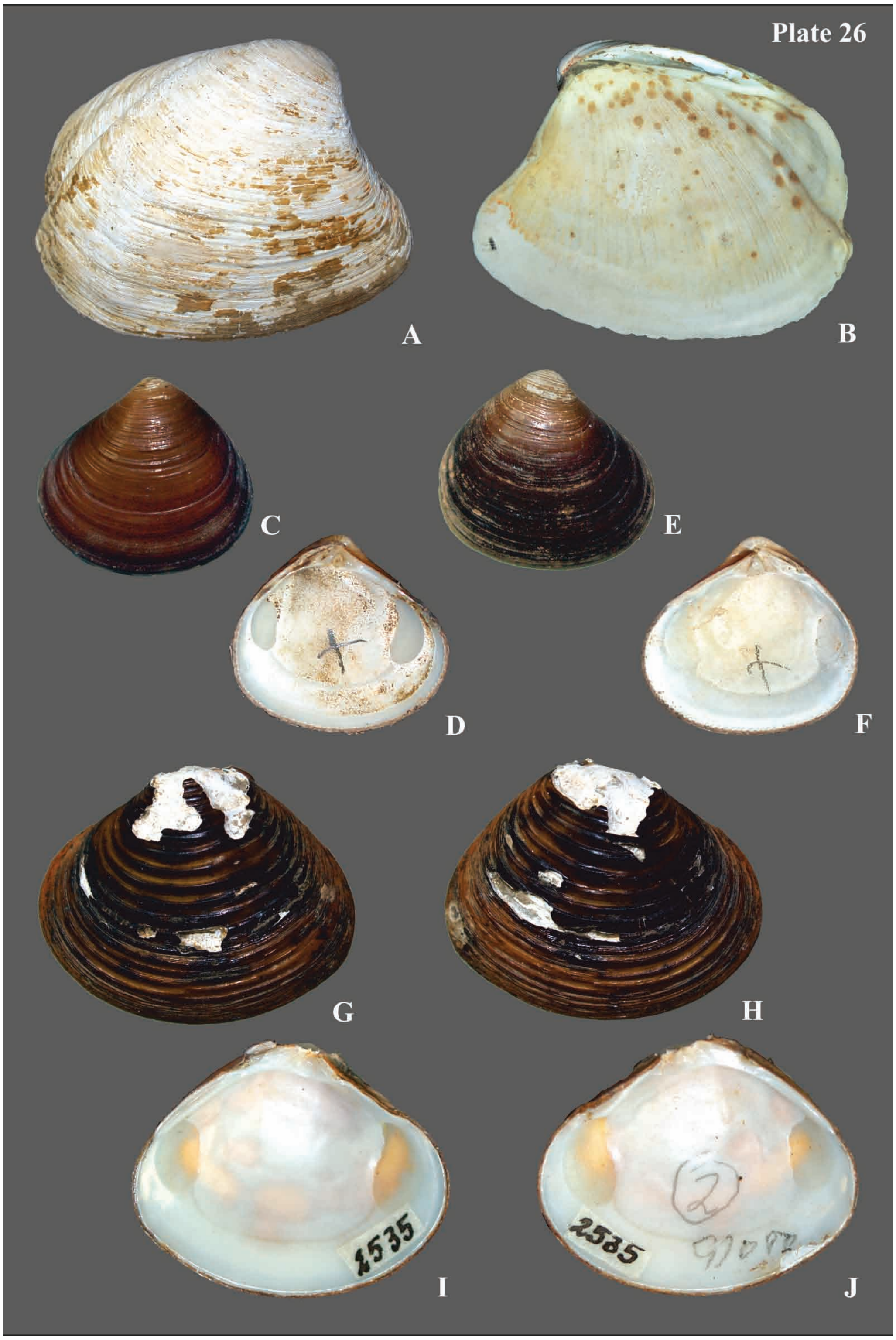
Figs. K, L. *Nipponomysella* cf. *subtruncata* (Yokoyama, 1927). **SK**: Yeongil Bay, depth 7 m, ZMFU 20549/Bv-3287.

Figs. M, N. *Borniola* sp. **SK**: Yeongil Bay, depth 8.5 m, length 7 mm, ZMFU 20402/Bv-3240.

Figs. O–R. *Trapezium* (*Neotrapezium*) *liratum* (Reeve, 1843). **SP**: Amursky Bay, Uglovoy Bay, length 32.4 mm, ZMFU 10078/Bv-520.

Figs. S, T. *Alveinus ojianus* (Yokoyama, 1927). **SP**: Peter the Great Bay, depth 13 m, length 1.9 mm, ZMFU 27786/Bv-4705.

Plate 26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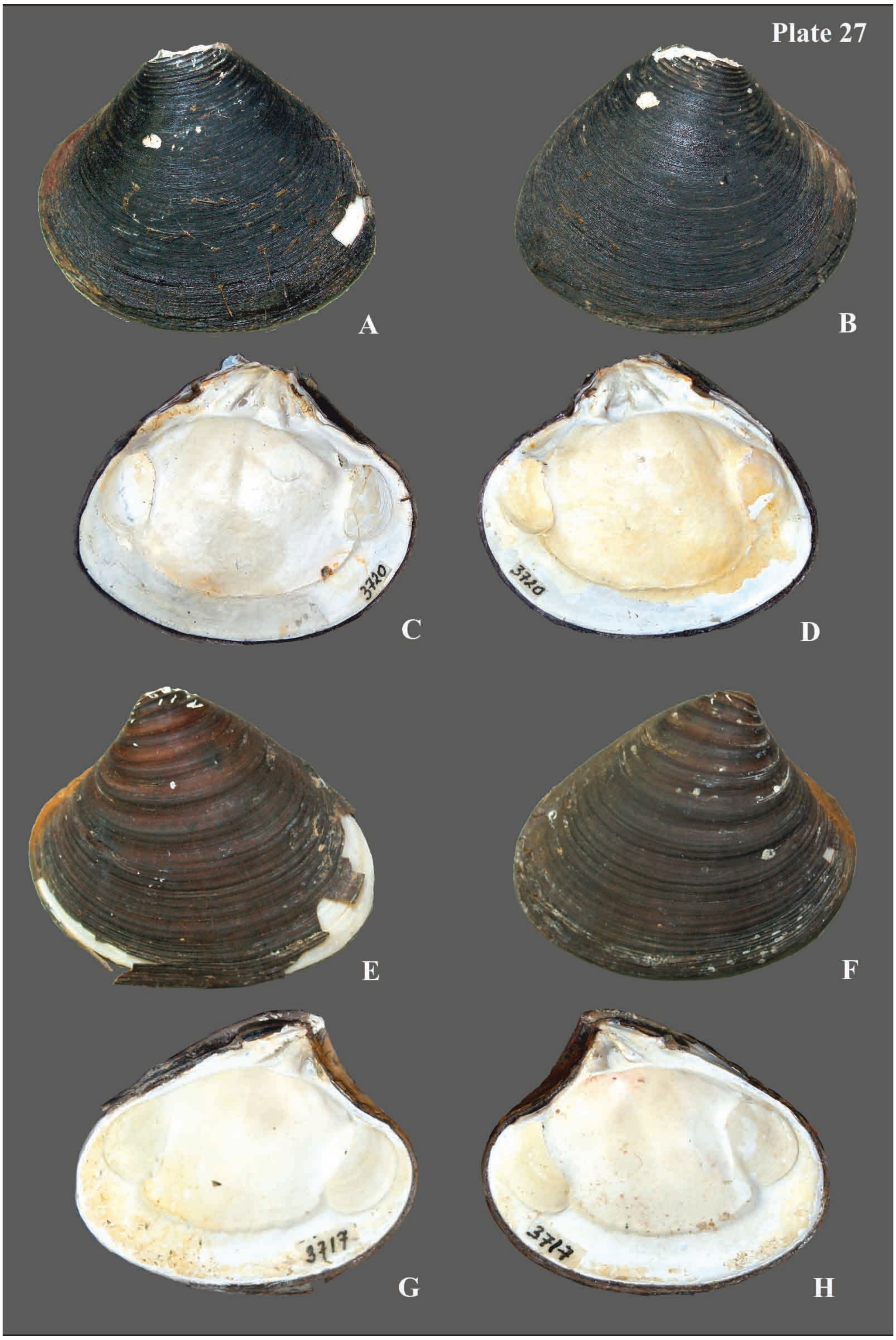
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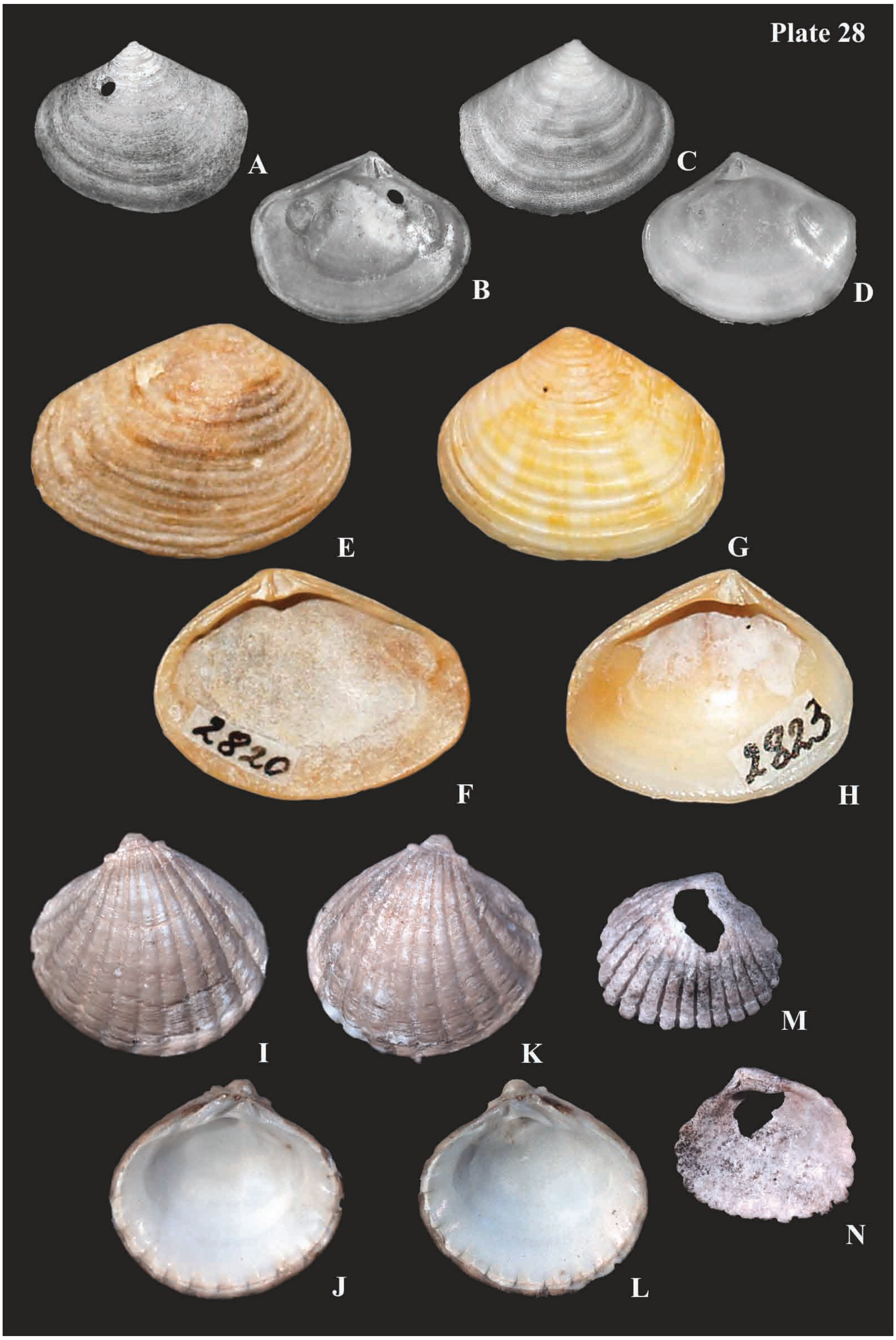
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Plate 29

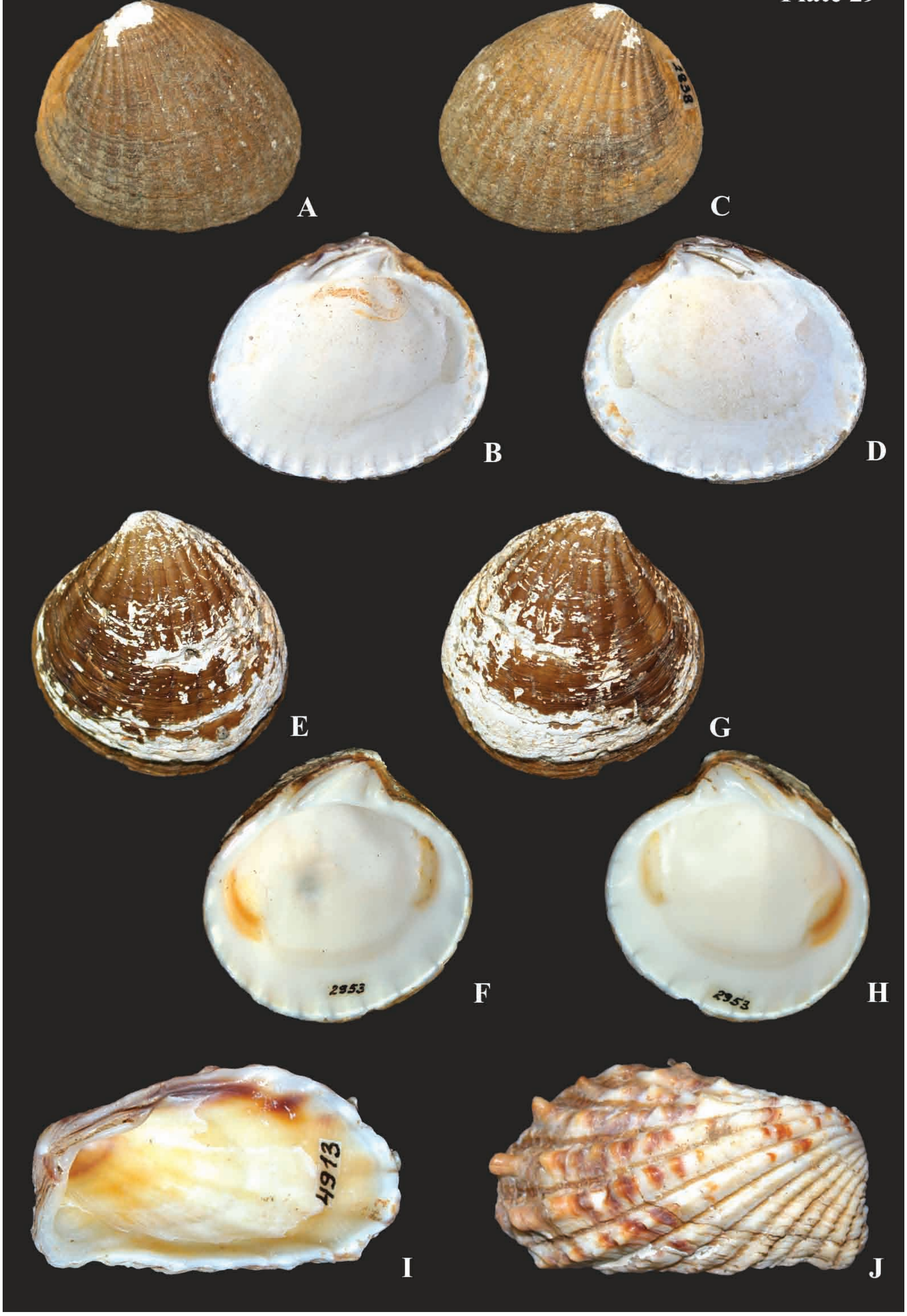
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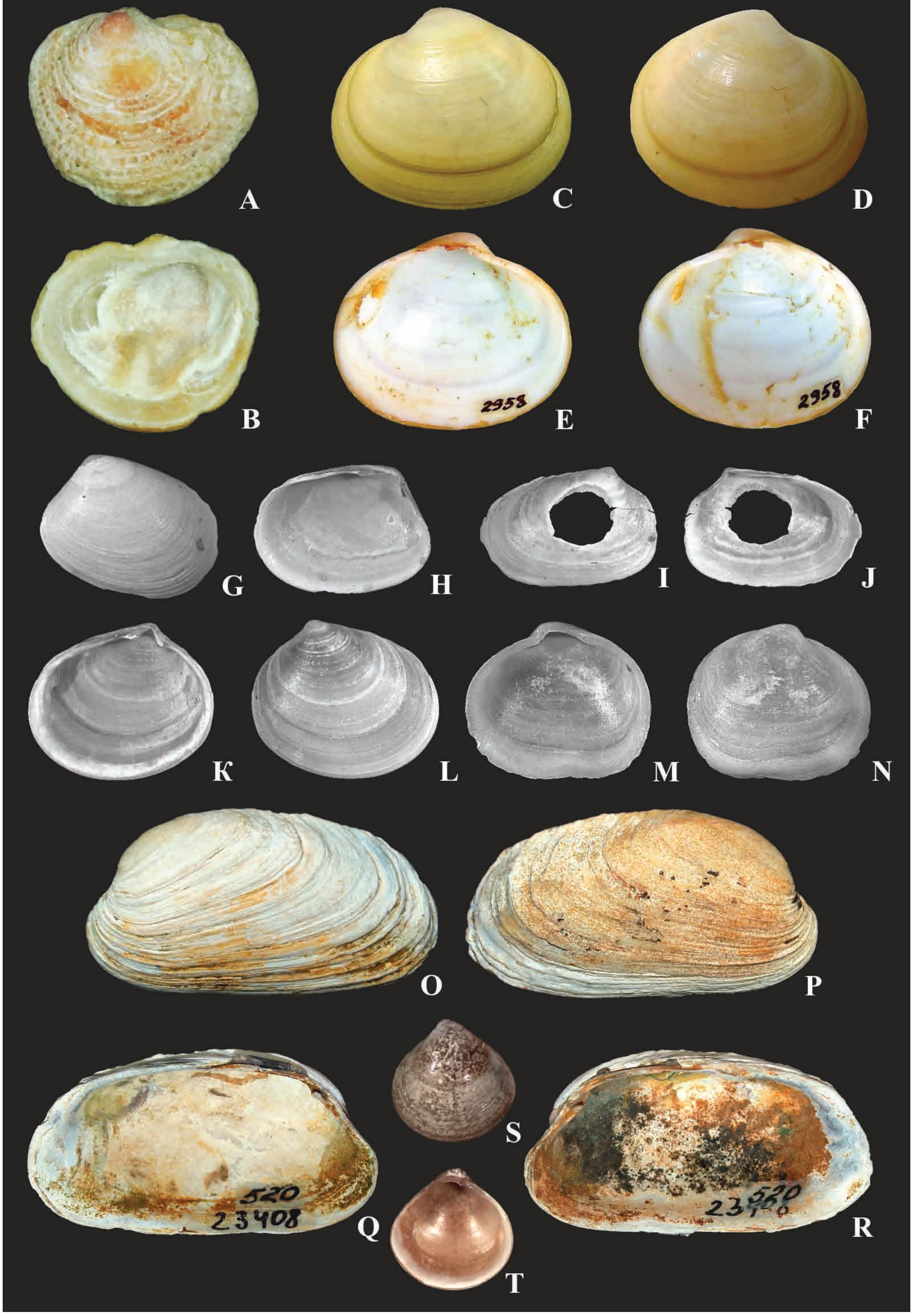
Plate 30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Explanations of Plates 31–35

Plate 31

Figs. A–D. *Clinocardium* (*Ciliatocardium*) *likharevi* Kafanov in Scarlato, 1981. **SP**: Ussuriysky Bay, depth 40 m, length 47.6 mm, ZMFU 18326/Bv-2547.

Figs. E–H. *Clinocardium* (*Ciliatocardium*) *ciliatum* (Fabricius, 1790). **SP**: Peter the Great Bay, south-western part, near Tumannaya River mouth, depth 54 m, length 70 mm, ZMFU 20950/Bv-3381.

Plate 32

Figs. A–D. *Clinocardium* (*Keenocardium*) *californiense* (Deshayes, 1839). **SP**: Peter the Great Bay, Bolshoy Pelis Is., length 58.7 mm, ZMFU 9148/Bv-144.

Figs. E–H. *Serripes* (*Serripes*) *groenlandicus* (Mohr, 1796). **SP**: Possjet Bay, depth 59 m, length 50.8 mm, ZMFU 22980/Bv-3725.

Plate 33

Figs. A–D. *S.* (*S.*) *groenlandicus* (Mohr, 1796). **SP**: Ussuriysky Bay, near Askolda Is., depth 68–71 m, length 113.4 mm, ZMFU 16575/Bv-2269.

Figs. E, F. *Fulvia mutica* (Reeve, 1844). **SK**: Gangwon Province, length 21.4 mm, ZMFU 19068/Bv-2648.

Figs. G, H. *Irus* (*Irus*) *irus* (L., 1758). **SK**: Yeongil Bay, depth 12 m, length 11.4 mm, ZMFU 20514/Bv-3264.

Figs. I, J. *Irus* (*Irus*) *mitis* (Deshayes, 1853). **SK**: Yeongil Bay, depth 1 m, length 28.3 mm, ZMFU 19305/Bv-2798.

Plate 34

Figs. A–D. *Irus* (*Irus*) *ishibashianus* Kuroda et Habe, 1952. **SK**: Gyeongbuk Province, near Chukpyon (Jukbyeon), length 14.3 mm, ZMFU 19406/Bv-2877.

Figs. E, F. *Paphia* (*Paphia*) *euglypta* (Philippi, 1847). **SK**: Busan, Haeundae Beach, length 65.5 mm, ZMFU 28745/Bv-4900.

Figs. G, H. *Gomphina* (*Macridiscus*) *melanaegis* Römer, 1860. **SK**: Gangwon Province, between Cape Sachondan and Yongok River mouth, length 34.3 mm, ZMFU 16323/Bv-2194.

Figs. I–L. *G.* (*M.*) *melanaegis* Römer, 1860. **SK**: Gangwon Province, Kallam Village, length 44.5 mm, ZMFU 16298/Bv-2189.

Plate 35

Figs. A–D. *Ruditapes philippinarum* (A. Adams et Reeve, 1850). **SP**: Peter the Great Bay, Boysmana Bay, length 45.8 mm, ZMFU 16789/Bv-2324.

Figs. E, F. *R. philippinarum* (A. Adams et Reeve, 1850). **SK**: Busan, Gwangalli Beach, length 42 mm, RGN collection.

Figs. G, H. *Cyclosunetta menstrualis* (Menke, 1843). **SK**: Busan, Haeundae Beach, length 17 mm, RGN collection.

Plate 31

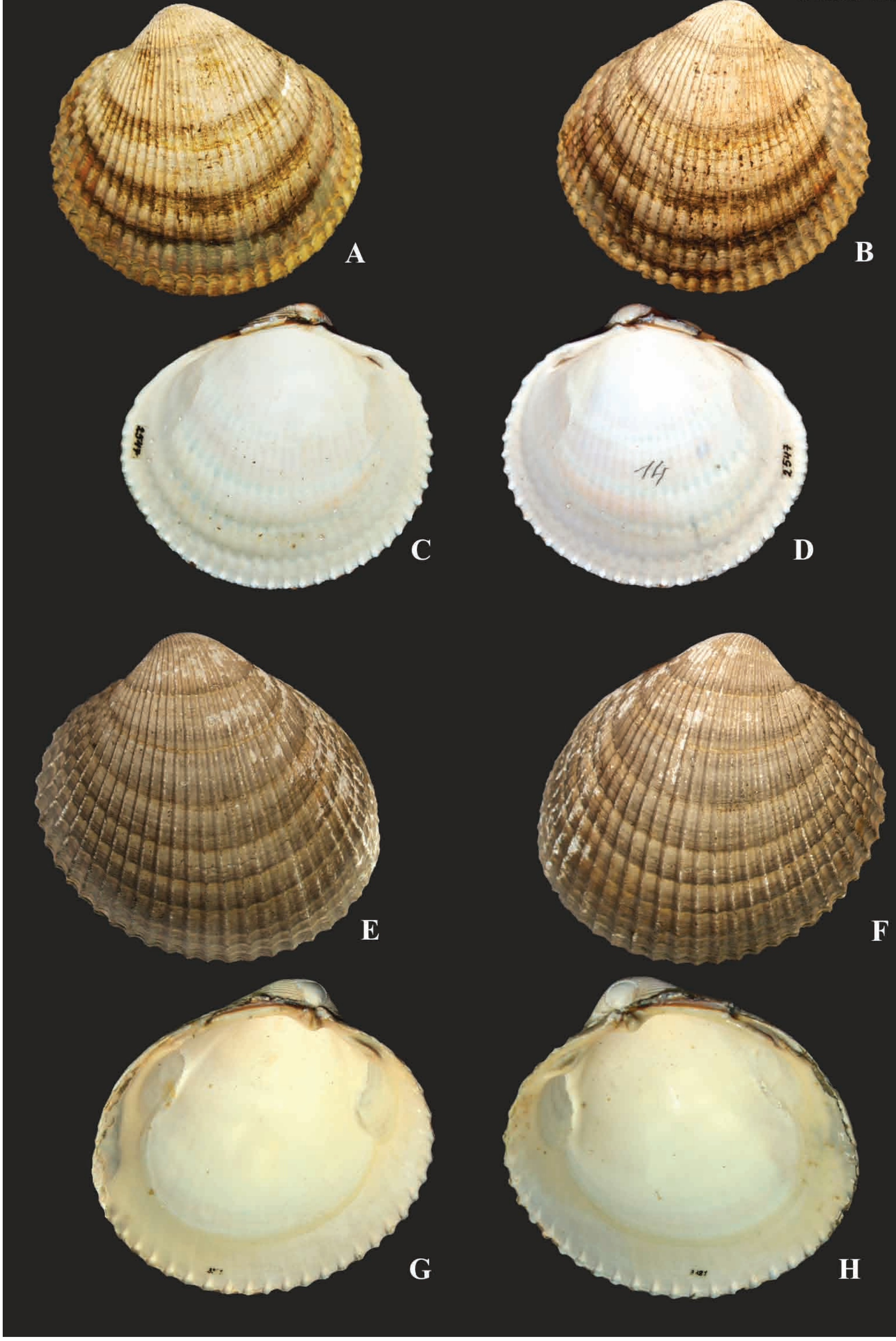
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Plate 32

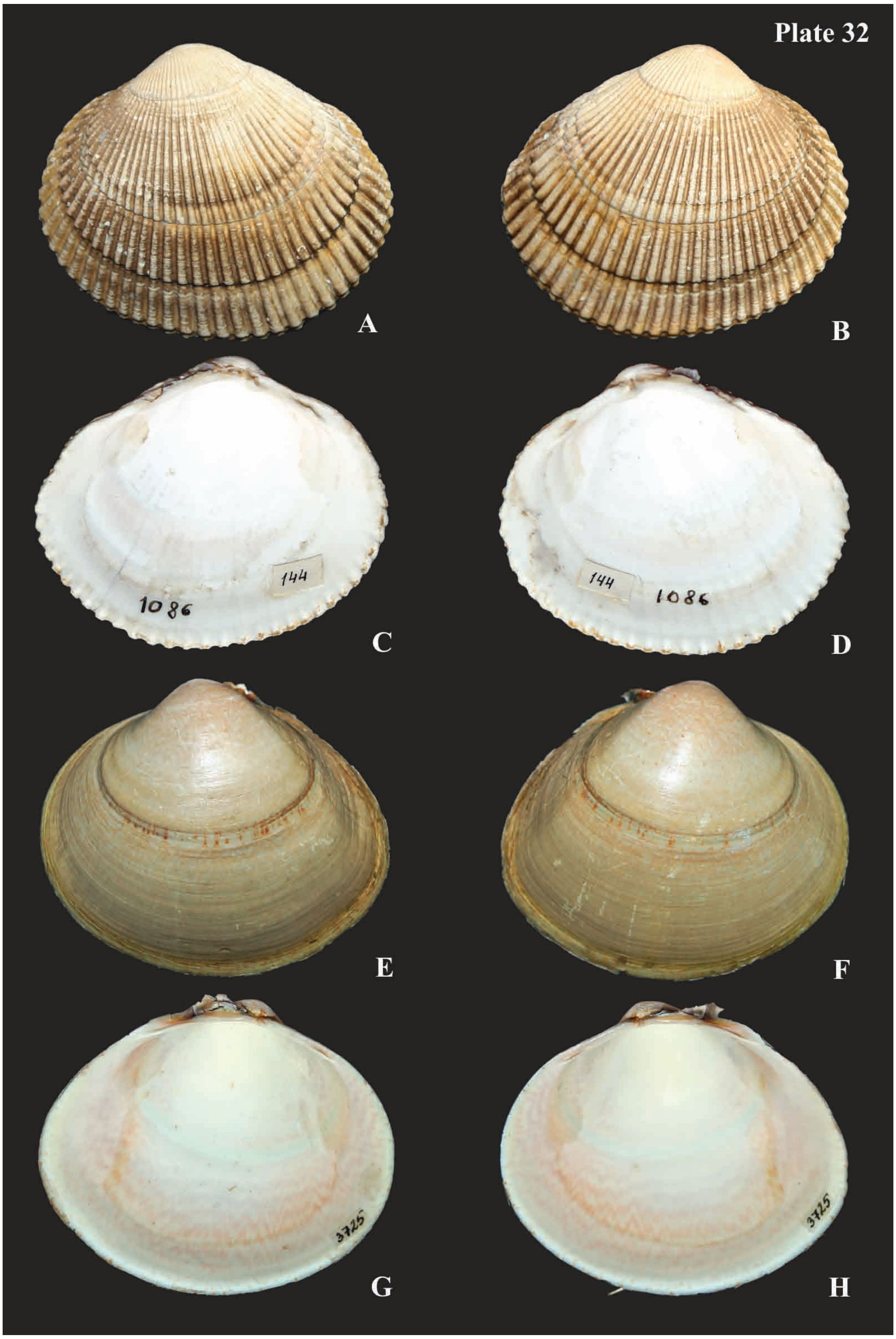
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Plate 33

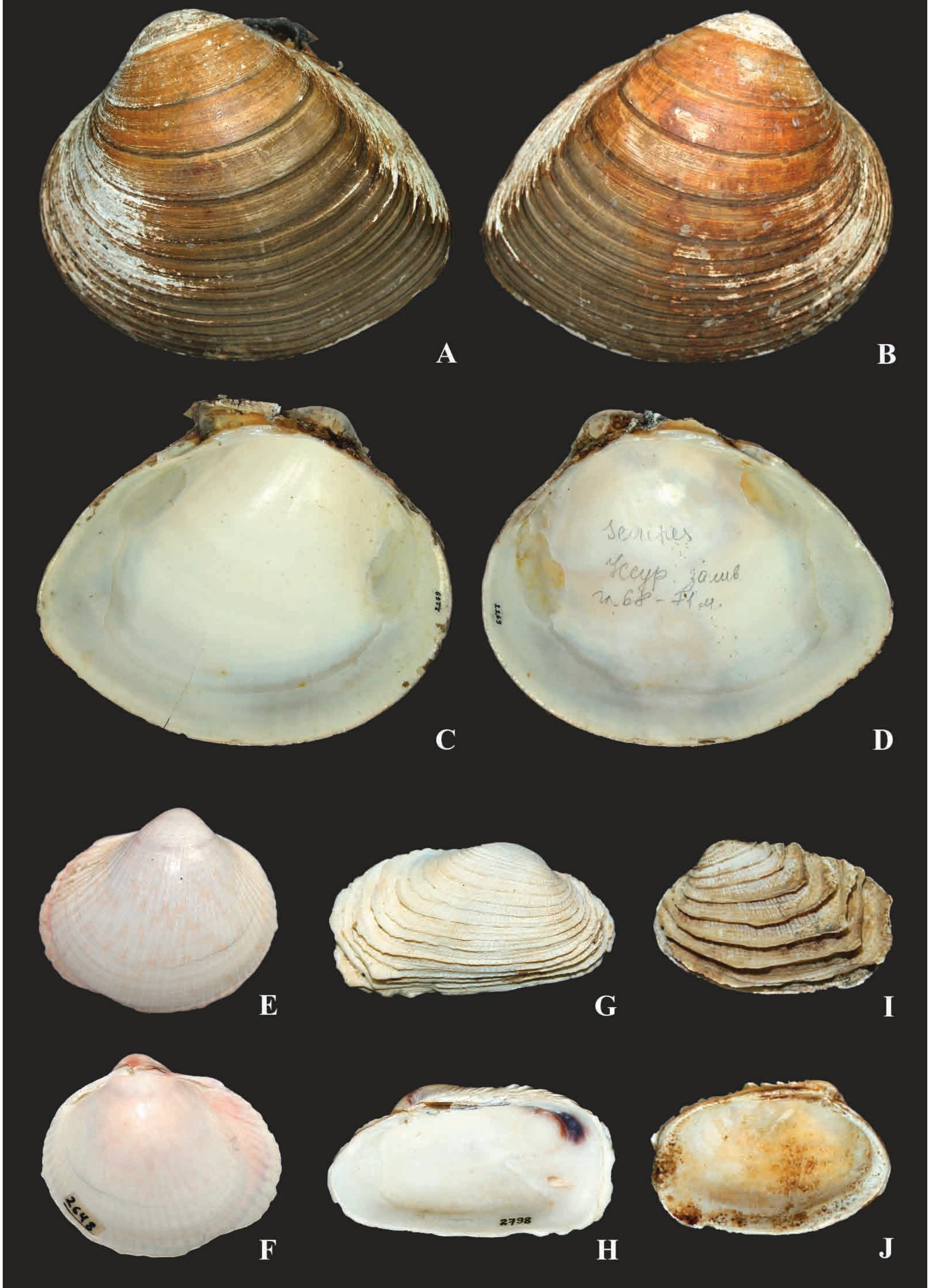
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Plate 34

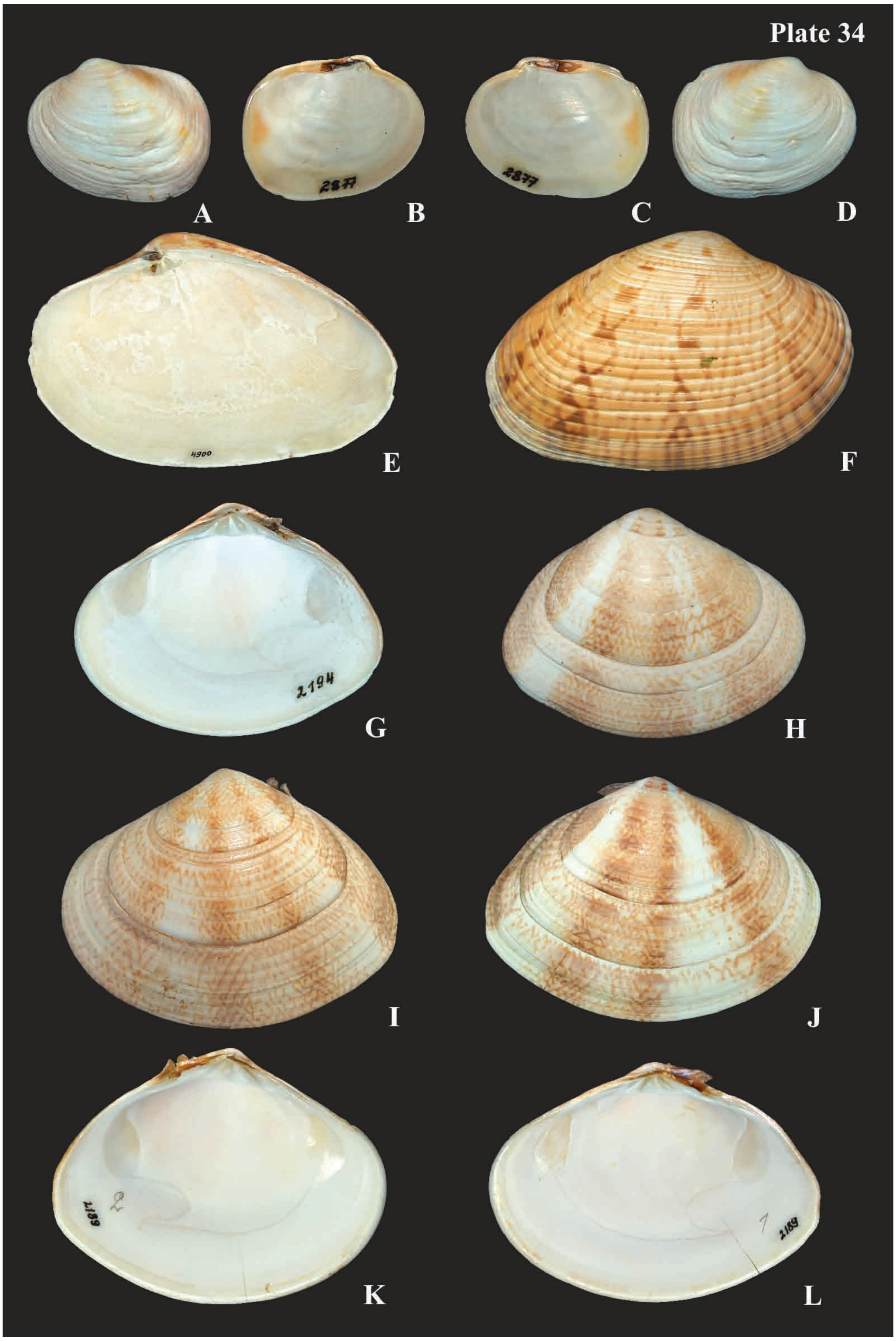
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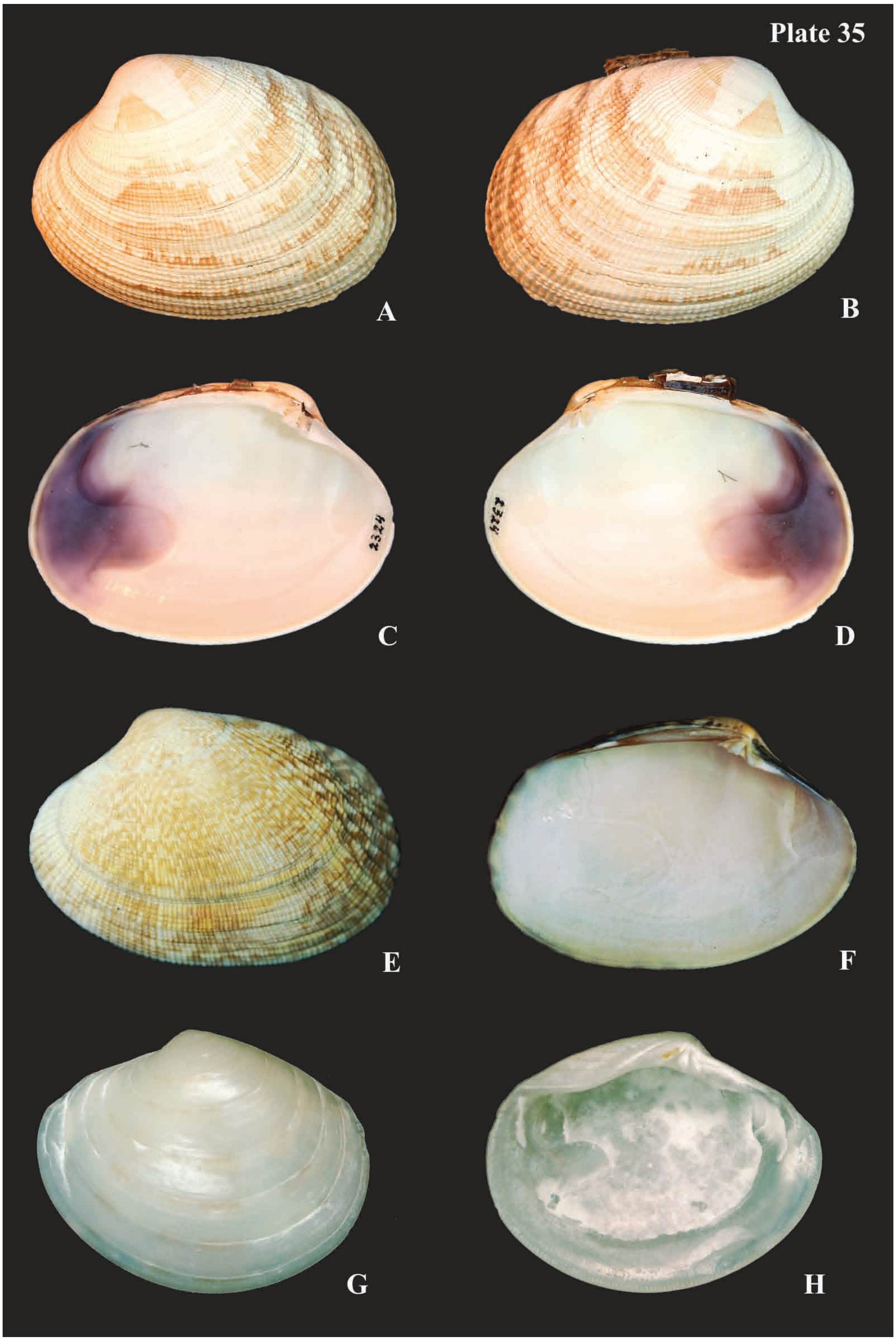
Plate 35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Explanations of Plates 36–40

Plate 36

Figs. A, B. *Antigona lamellaris* Schumacher, 1817. **SK**: Busan, length 54.3 mm, ZMFU 28061/Bv-4854.

Figs. C, D. *A. lamellaris* Schumacher, 1817. **SK**: Busan, length 51.5 mm, ZMFU 28061/Bv-4854.

Figs. E–H. *Mercenaria stimpsoni* (Gould, 1861). **SP**: Possjet Bay, Troitsa Bay, length 83.6 mm, ZMFU 18144/Bv-2495.

Plate 37

Figs. A–D. *Saxidomus purpurata* (Sowerby II, 1852). **SP**: Possjet Bay, Krabbe Peninsula, length 106.1 mm, ZMFU 10000/Bv-471.

Figs. E–H. *Protothaca* (*Protocallithaca*) *adamsii* (Reeve, 1863). **SP**: Possjet Bay, Reid Pallada Bay, depth 24 m, length 70.8 mm, ZMFU 14376/Bv-1825.

Plate 38

Figs. A–D. *Protothaca* (*Protothaca*) *euglypta* (Sowerby III, 1914). **SP**: Ussuriysky Bay, Sobol Bay, length 44.2 mm, ZMFU 20230/Bv-3130.

Figs. E–H. *Protothaca* (*Novathaca*) *jedoensis* (Lischke, 1874). **SP**: Ussuriysky Bay, Sobol Bay, length 45.8 mm, ZMFU 20229/Bv-3129.

Plate 39

Figs. A–D. *Dosinia* (*Dosinella*) *penicillata* (Reeve, 1850). **SP**: Ussuriysky Bay, Sukhodol Bay, length 48.0 mm, ZMFU 10325/Bv-702.

Figs. E–H. *Dosinia* (*Phacosoma*) *japonica* (Reeve, 1850). **SP**: Possjet Bay, Troitsa Bay, length 51.6, ZMFU 16222/Bv-2774.

Plate 40

Figs. A, B. *D.* (*Ph.*) *japonica* (Reeve, 1850). **SK**: Busan, Gwangalli Beach, length 39 mm, RGN collection.

Figs. C, D. *Dosinia* (*Phacosoma*) *troscheli* (Lischke, 1873). **SK**: Busan, Haeundae Beach, length 32.1 mm, ZMFU 28782/Bv-4901.

Figs. E, G. *Liocyma fluctuosum* (A.A. Gould, 1841). **SP**: Peter the Great Bay, near Reineke Is., depth 40 m, length 33.2 mm, ZMFU 17313/Bv-2376.

Figs. F, H. *L. fluctuosum* (A.A. Gould, 1841). **SP**: Peter the Great Bay, near Reineke Is., depth 40 m, length 27. 4 mm, ZMFU 17313/Bv-2376.

Plate 36

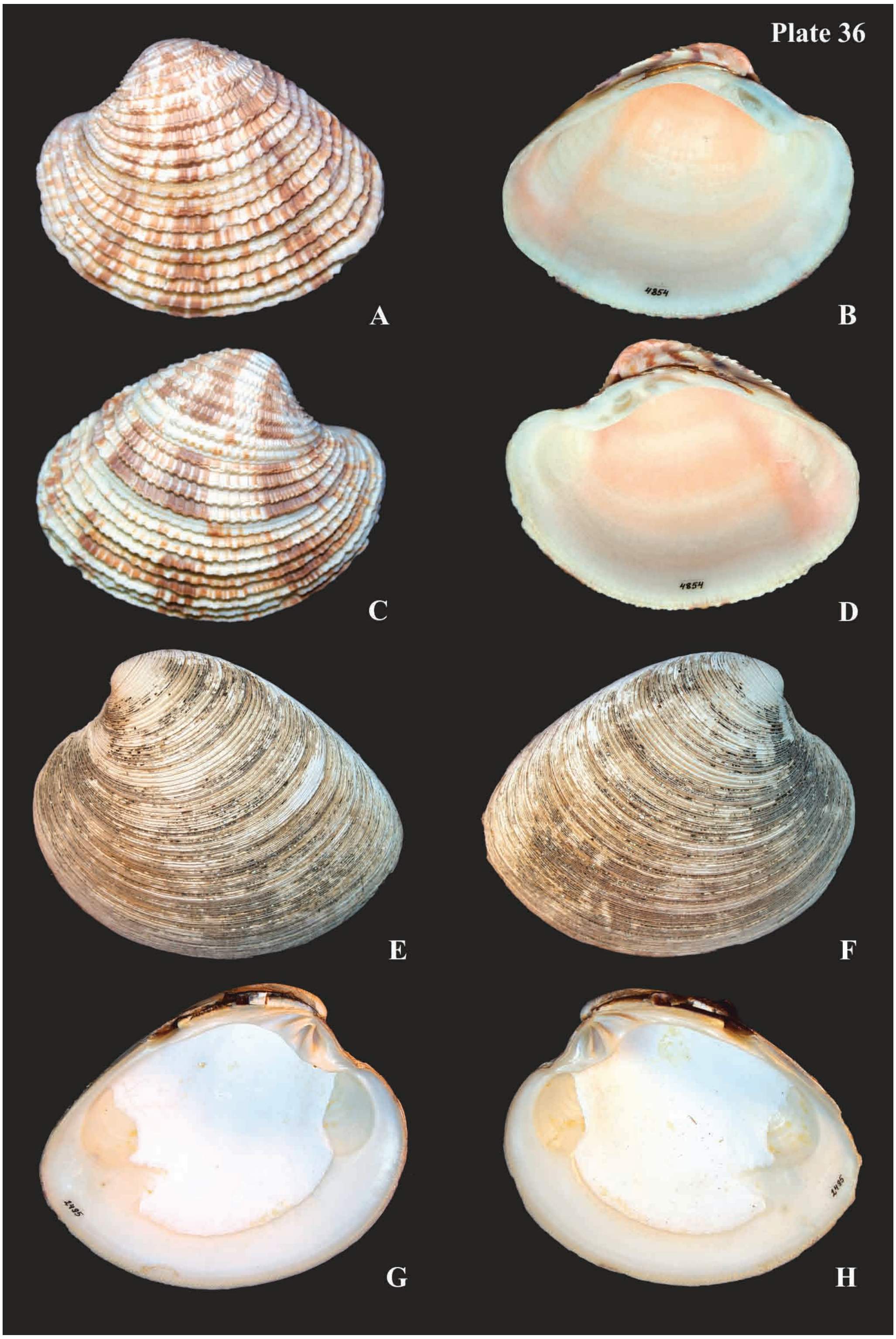
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Plate 37

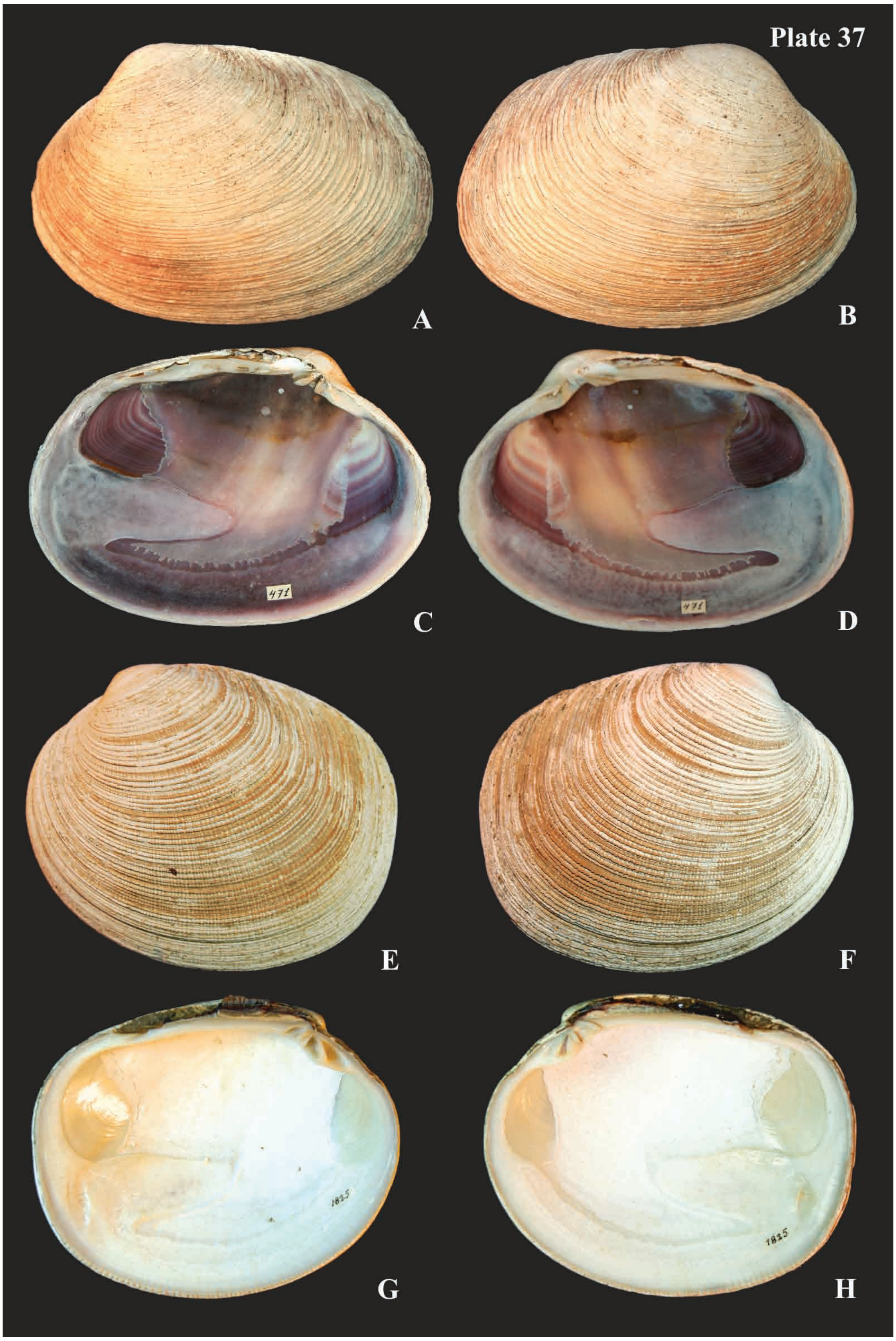
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Plate 38

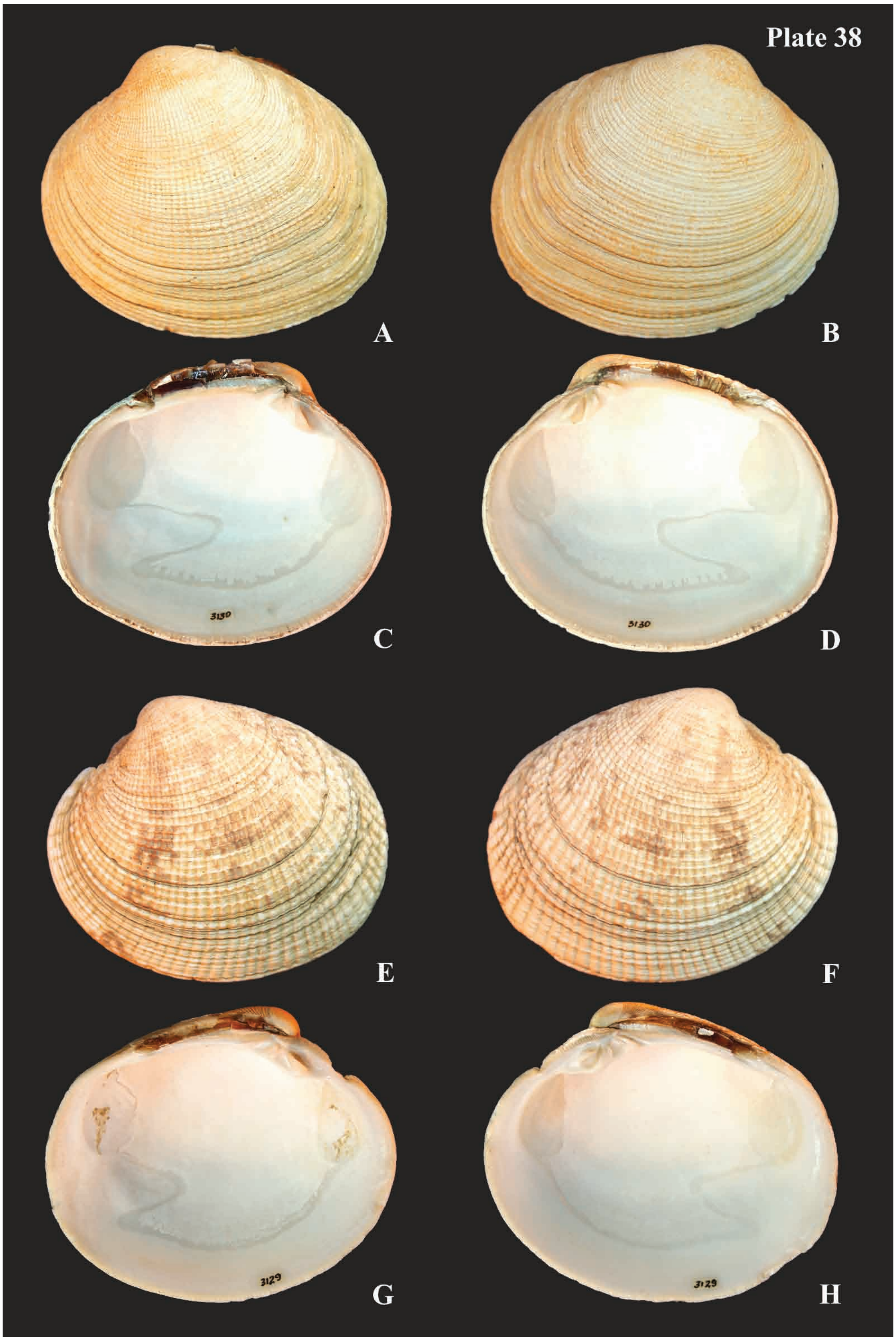
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Plate 39

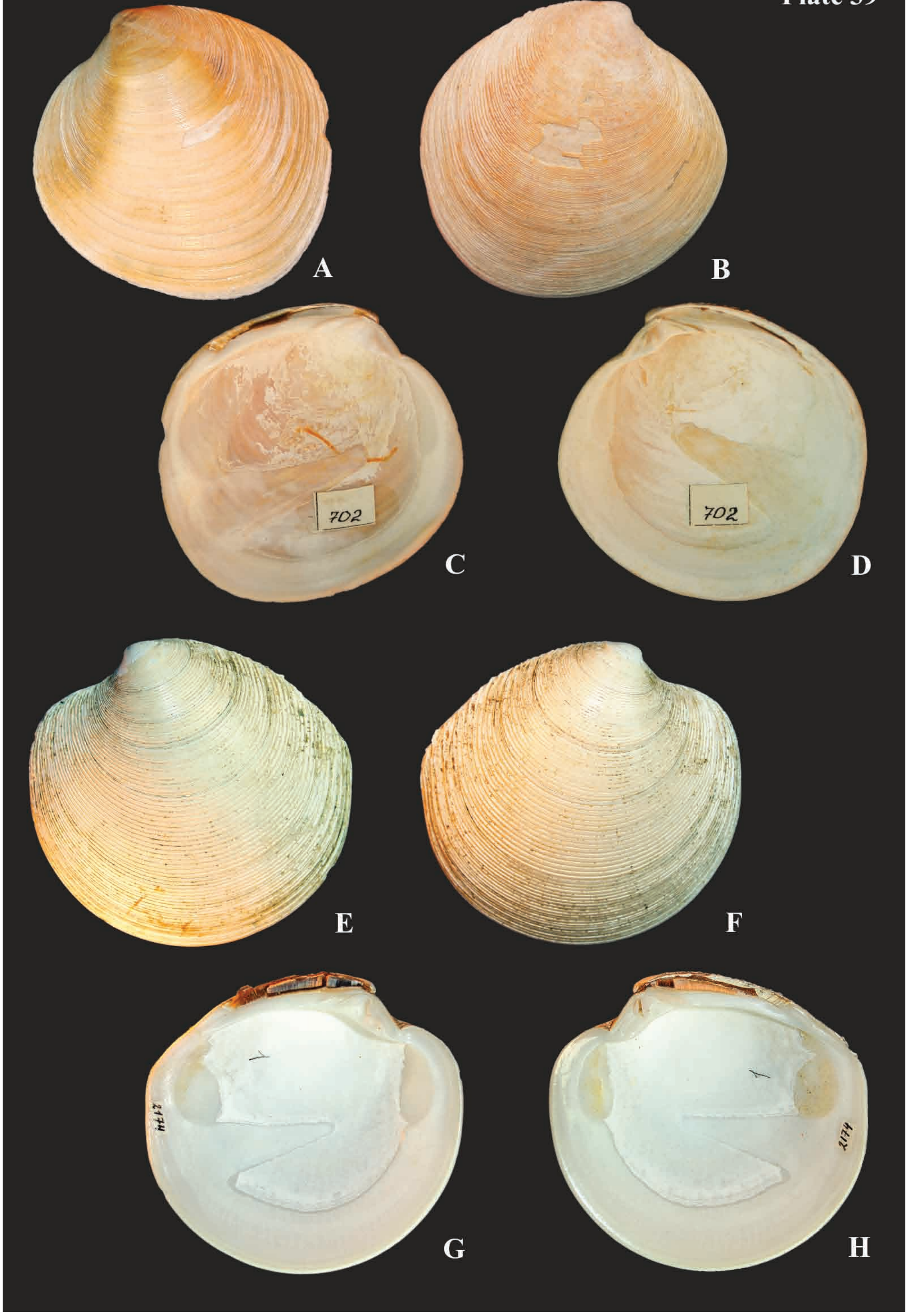
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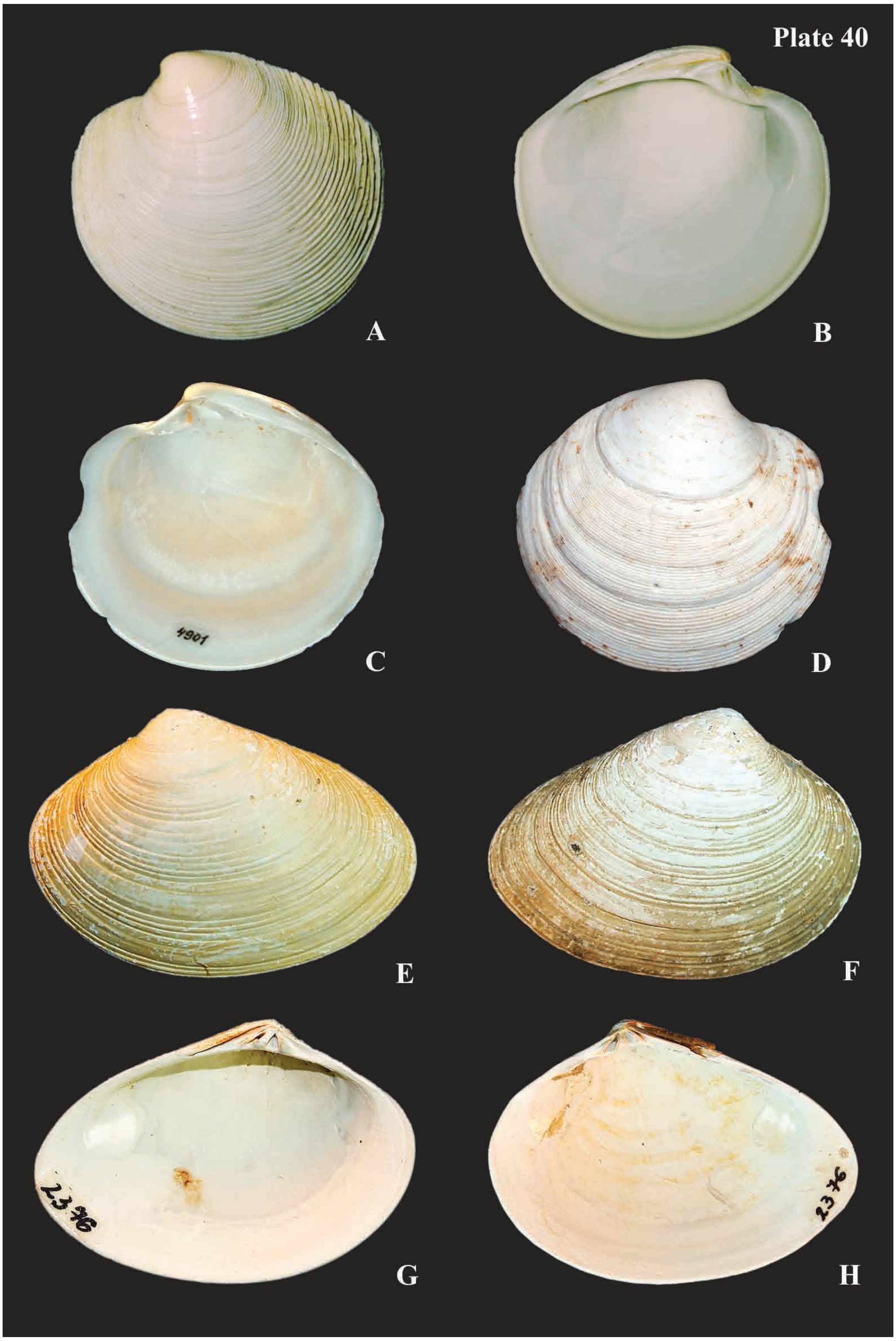
Plate 40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Explanations of Plates 41–45

Plate 41

Figs. A–D. *Callista* (*Ezocallista*) *brevisiphonata* (Carpenter, 1864). **SP**: Possjet Bay, Vityaz Bay, depth 2 m, length 106.2 mm, ZMFU 23293/Bv-3777.

Figs. E, F. *Callista* (*Callista*) *chinensis* (Holten, 1803). **SK**: Busan, Gwangalli Beach, length 62 mm, RGN collection.

Figs. G, H. *Petricolirus aequistriatus* (Sowerby II, 1874). **SK**: Yeongil Bay, length 35.1 mm, ZMFU 19306/Bv-2799.

Plate 42

Fig. A. *Turtonia minuta* (Fabricius, 1780). **SP**: Ussuriysky Bay, Sobol Bay, length 2.6 mm, ZMFU 18962/Bv-2596.

Figs. B–E. *Cadella lubrica* (Gould, 1861). **SP**: Peter the Great Bay, Furugelma Is., 15.5 mm, ZMFU 9340/Bv-236.

Figs. F, G. *Nitidotellina minuta* (Lischke, 1872). **SK**: Yeongil Bay, depth 18 m, length 15.6 mm, ZMFU 19296/Bv-2789.

Figs. H, I. *Nitidotellina hokkaidoensis* (Habe, 1961). **SK**: Busan, Songyeong Beach, length 23 mm, RGN collection.

Figs. J, K. *Nitidotellina pallidula* (Lischke, 1871). **SK**: Yeongil Bay, depth 17 m, length 18.5 mm, ZMFU 19298/Bv-2791.

Plate 43

Figs. A, B. *Macoma* (*Macoma*) *middendorffi* Dall,1884. **MNP**: Tatarsky Strait, length 44.8 mm, ZMFU 11589/Bv-1483.

Figs. C, D. *Macoma* (*Rexithaerus*) *sectior* (Oyama, 1950). **SK**: Yeongil Bay, near Limgok Village, length 40.5 mm, ZMFU 19293/Bv-2786.

Figs. E–H. *Macoma* (*Macoma*) *balthica* (L., 1758) s.l. **SP**: Amursky Bay, inner part, length 21.6 mm, ZMFU 20652/Bv-3333.

Plate 44

Figs. A–D. *Macoma* (*Macoma*) *coani* Kafanov et Lutaenko, 1999. **MNP**: Dzhigit Bay, length 37.1 mm, ZMFU 27696/Bv-4647.

Figs. E, F. *Macoma* (*Rexithaerus*) *hokkaidoensis* Amano et Lutaenko in Amano, Lutaenko et Matsubara, 1999. **MNP**: Dzhigit Bay, length 49.8 mm, ZMFU 25189/Bv-4216.

Figs. G–J. *Macoma* (*Macoma*) *loveni* (Jensen, 1905). **SP**: Peter the Great Bay, Reineke Is., depth 40 m, length 12.8 mm, ZMFU 19438/Bv-2904.

Plate 45

Figs. A–D. *Macoma* (*Macoma*) *nipponica* (Tokunaga, 1906). **SP**: Possjet Bay, length 18.8 mm, ZMFU 9345/Bv-241.

Figs. E–H. *Macoma* (*Macoma*) *incongrua* (Martens, 1865). **MNP**: Vladimira Bay, length 26 mm, ZMFU 21072/Bv-3433.

Plate 41

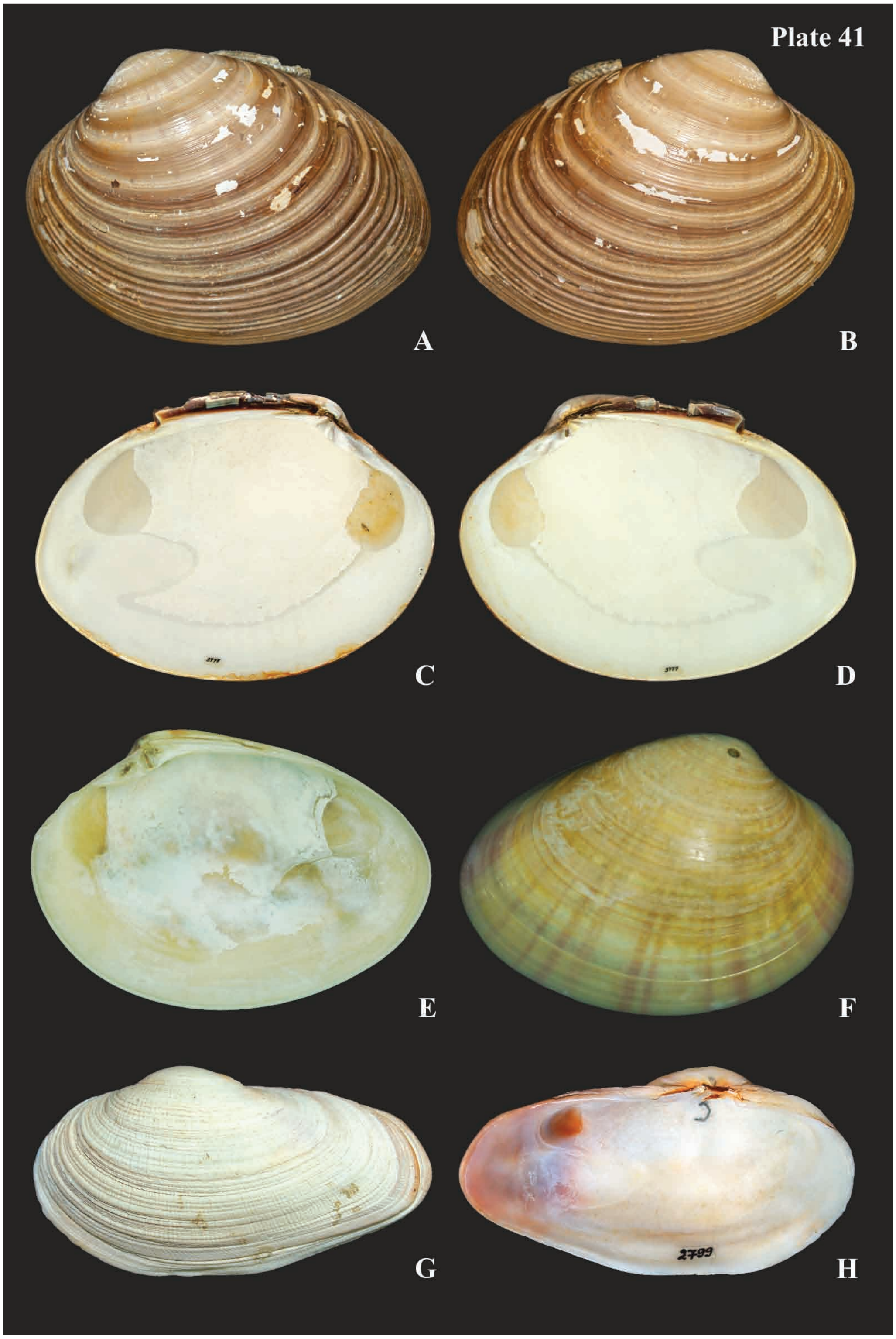
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Plate 42

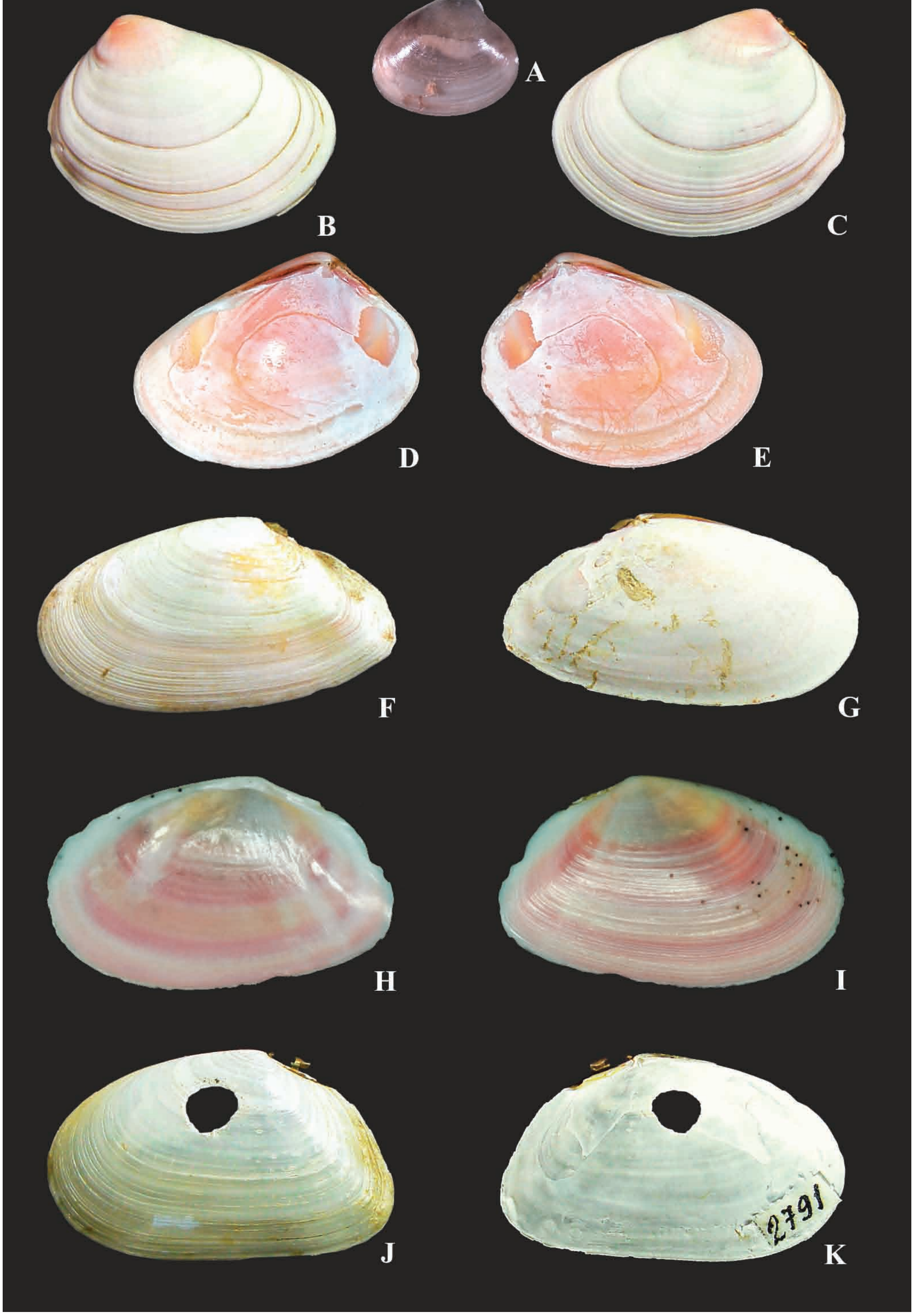
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Plate 43

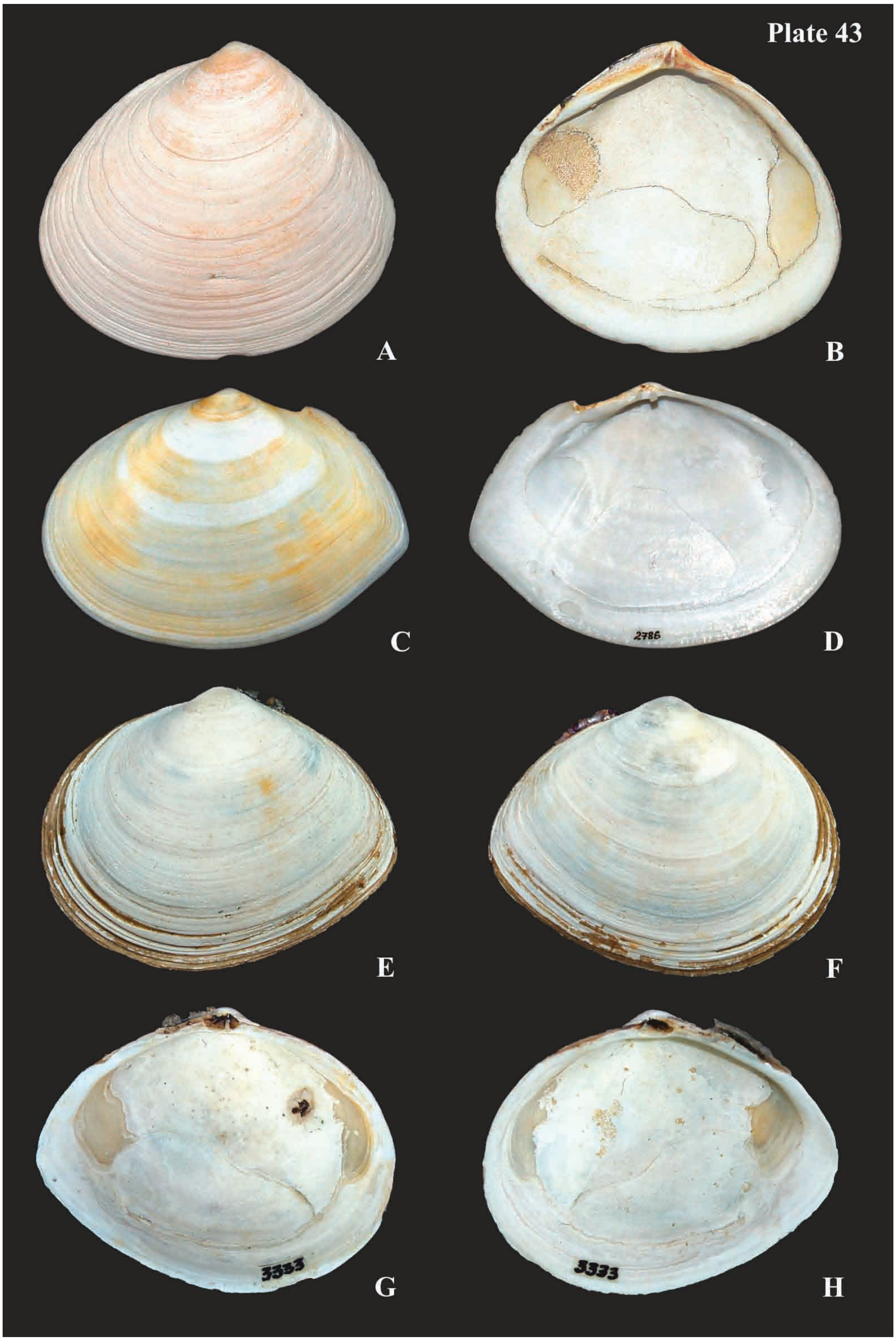
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Plate 44

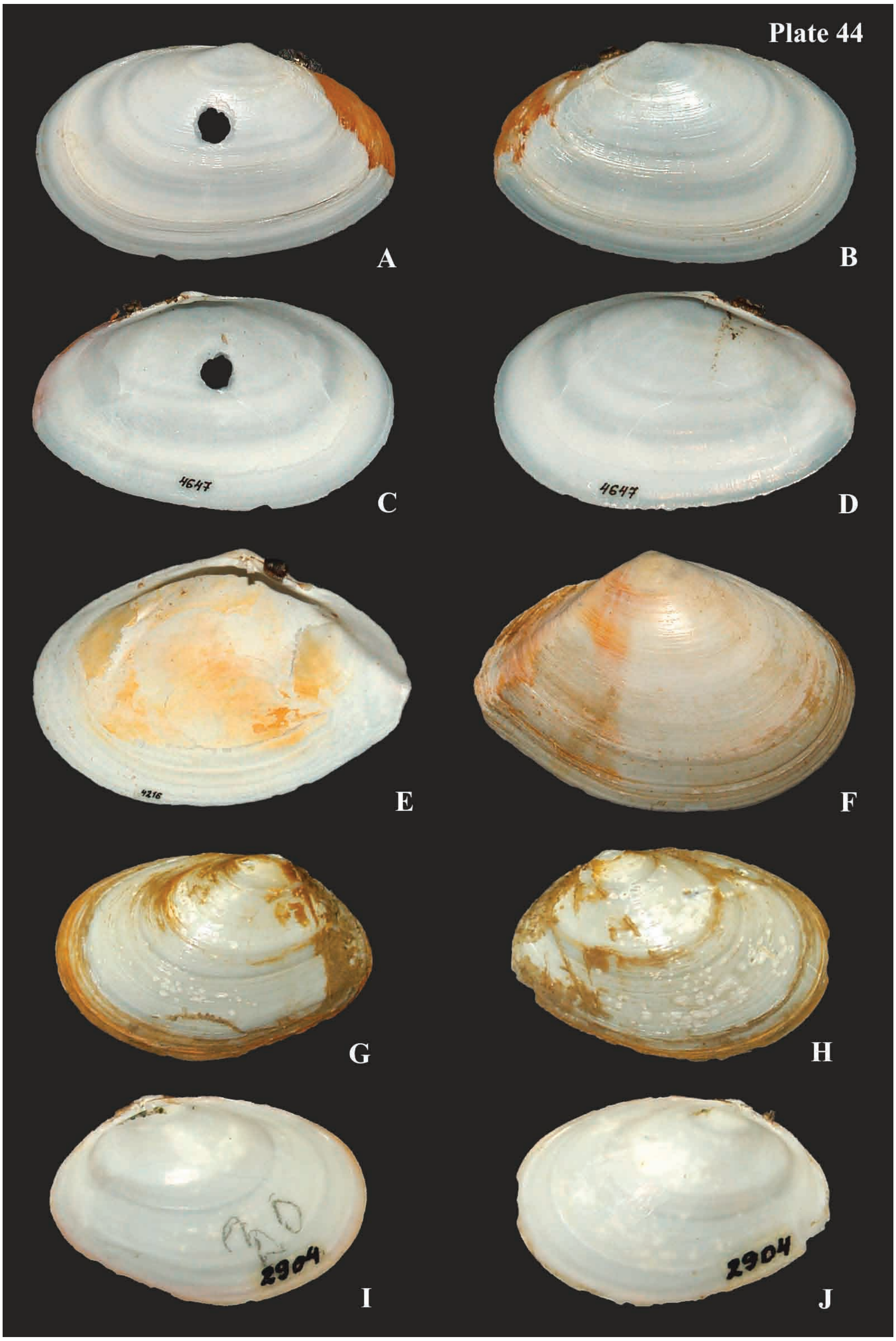
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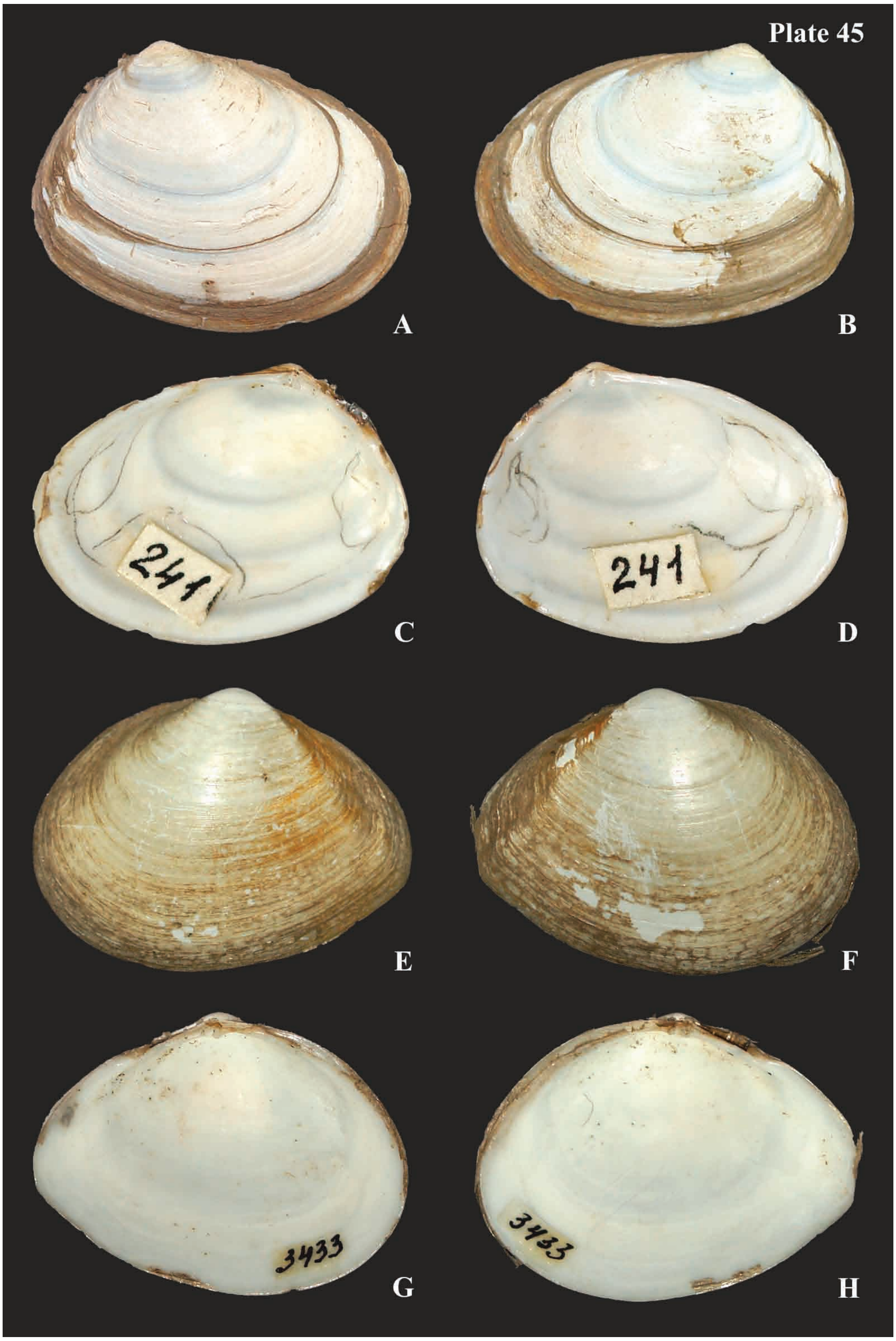
Plate 45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Explanations of Plates 46–50

Plate 46

Figs. A–D. *Macoma* (*Macoma*) *calcarea* (Gmelin, 1791). **SP**: Peter the Great Bay, near Bolshoy Pelis Is., depth 67 m, length 46 mm, ZMFU 22983/Bv-3718.

Figs E–H. *Macoma* (*Macoma*) *tokyoensis* Makiyama, 1927. **SP**: Possjet Bay, depth 10 m, length 40.5 mm, ZMFU 9310/Bv-206.

Plate 47

Figs. A–D. *Macoma* (*Macoma*) *scarlatoi* Kafanov et Lutaenko, 1997. **SP**: Possjet Bay, depth 38 m, length 55.8 mm, ZMFU 17324/Bv-2383.

Figs E–H. *Macoma* (*Macoma*) *contabulata* (Deshayes, 1854). **SP**: Possjet Bay, length 75.2 mm, ZMFU 22655/Bv-3606.

Plate 48

Figs. A–D. *Macoma* (*Heteromacoma*) *irus* (Hanley, 1844). **SP**: Ussuriysky Bay, Sobol Bay, length 42.1 mm, ZMFU 20386/Bv-3227.

Figs. E, F. *M.* (*H.*) *irus* (Hanley, 1844). **SK**: Busan, Mollundae Is., length 34 nm, RGN collection.

Figs. G, H. *Macoma* (*Macoma*) *praetexta* (Martens, 1865). **SK**: Busan, Songyeong Beach, length 23 mm, RGN collection.

Plate 49

Figs. A, B. *Macoma* (*Macoma*) sp. **SP**: Peter the Great Bay, depth 62 m, length 61 mm, collection of IMB.

Figs. C, D. *Moerella jedoensis* (Lischke, 1872). **SK**: Yeongil Bay, depth 23 m, length 17.5 mm, ZMFU 20641/Bv-3329.

Figs. E, F. *Moerella* sp. **SK**: Yeongil Bay, depth 19.5 m, length 30.3 mm, ZMFU 19260/Bv-2783.

Figs. G, H. *Merisca* (*Pistris*) *capsoides* (Lamarck, 1818). **SK**: Busan, Gwangalli Beach, length 21 mm, RGN collection.

Plate 50

Figs. A–D. *Megangulus venulosus* (Schrenck, 1861). **SP**: Peter the Great Bay, Boysmana Bay, length 81.9 mm, ZMFU 16735/Bv-2300.

Figs. E, F. *Megangulus luteus* (Wood, 1828). **SP**: Ussuriysky Bay, Lazurnaya (Shamora) Bay, length 82.4 mm, ZMFU 27931/Bv-4790.

Figs. G–J. *Megangulus zyonoensis* (Hatai et Nisiyama, 1939). **SP**: Peter the Great Bay, Russky Is., Karpinskogo Bay, length 89.5 mm, ZMFU 26019/Bv-4374.

Plate 46

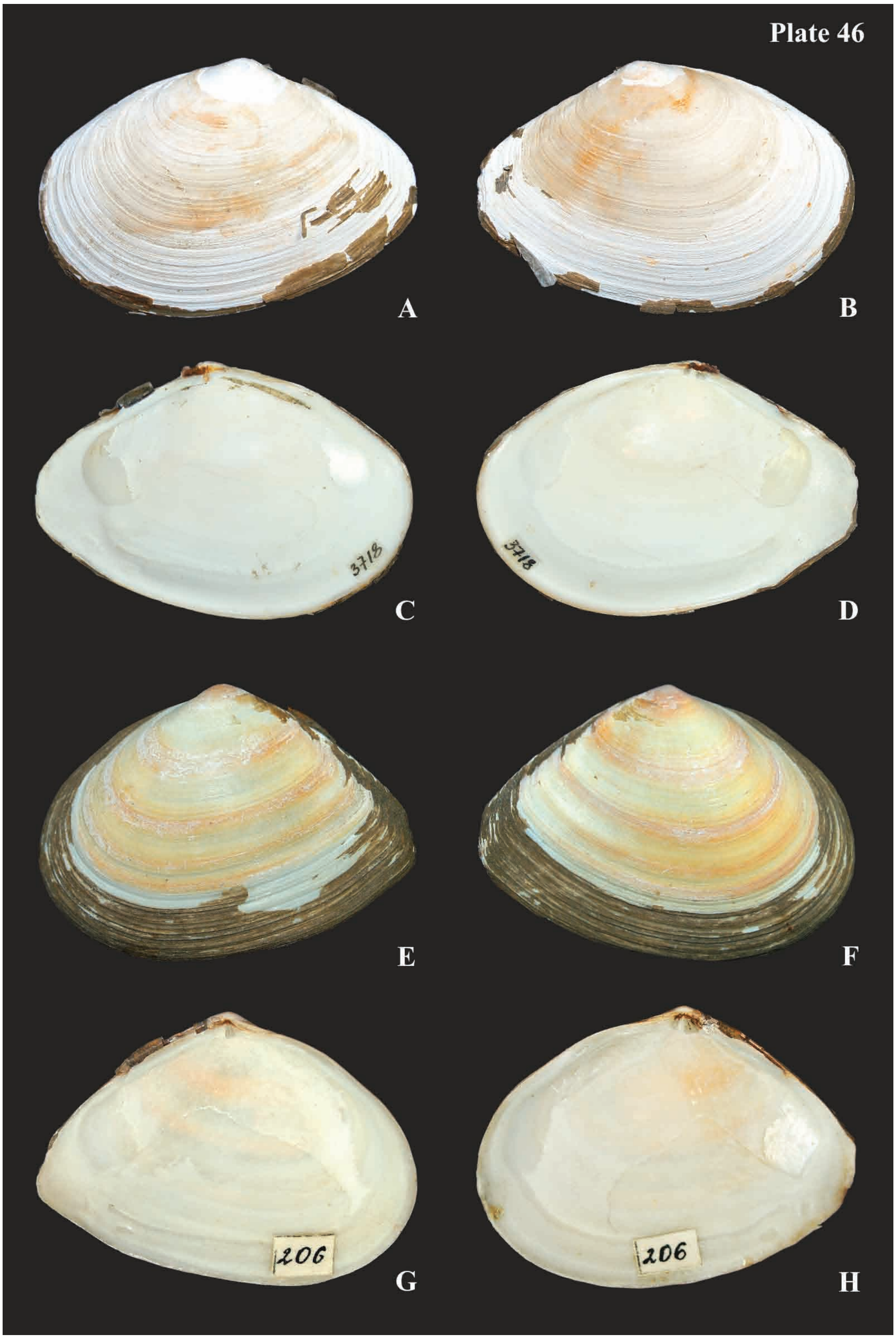
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Plate 47

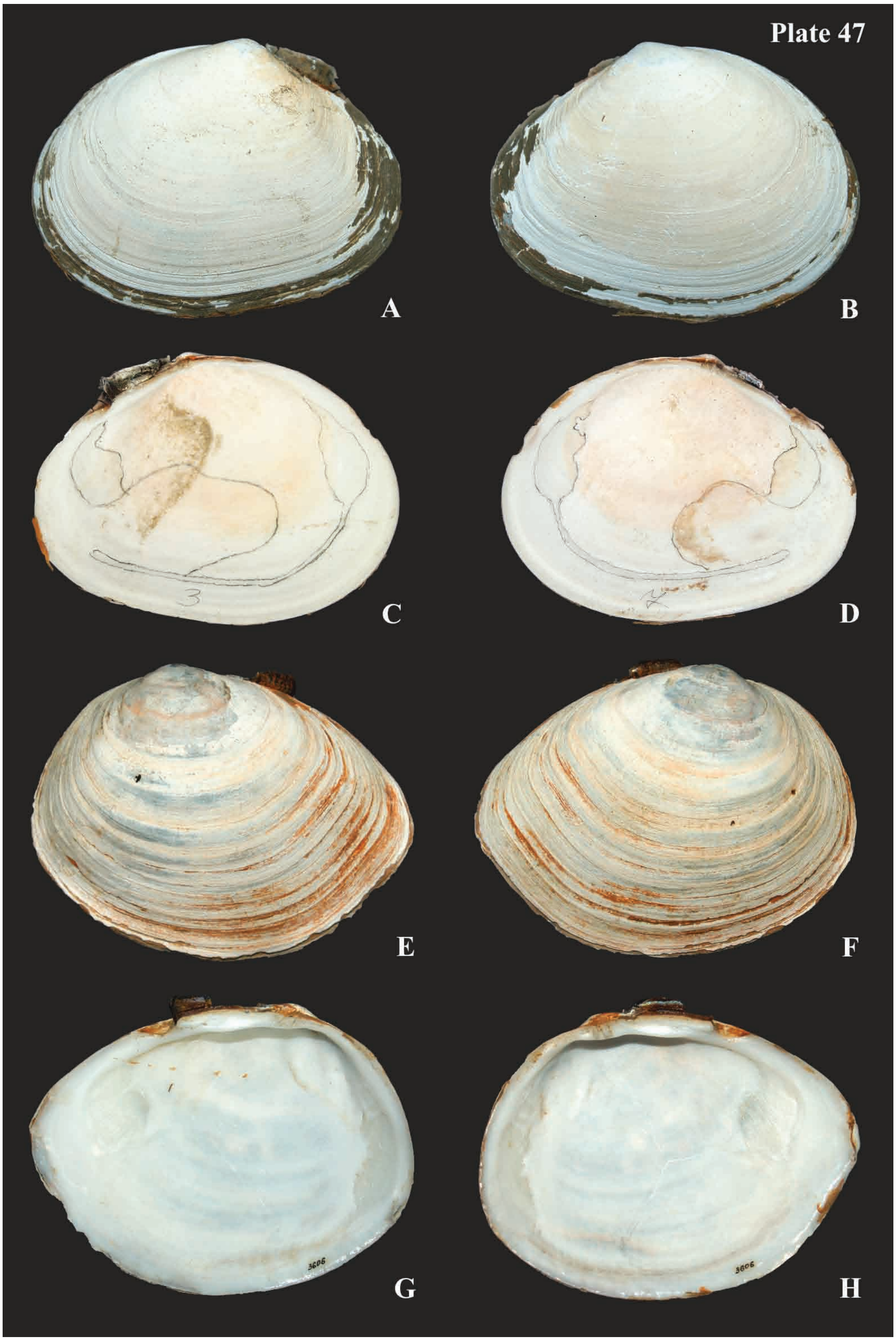

Plate 48

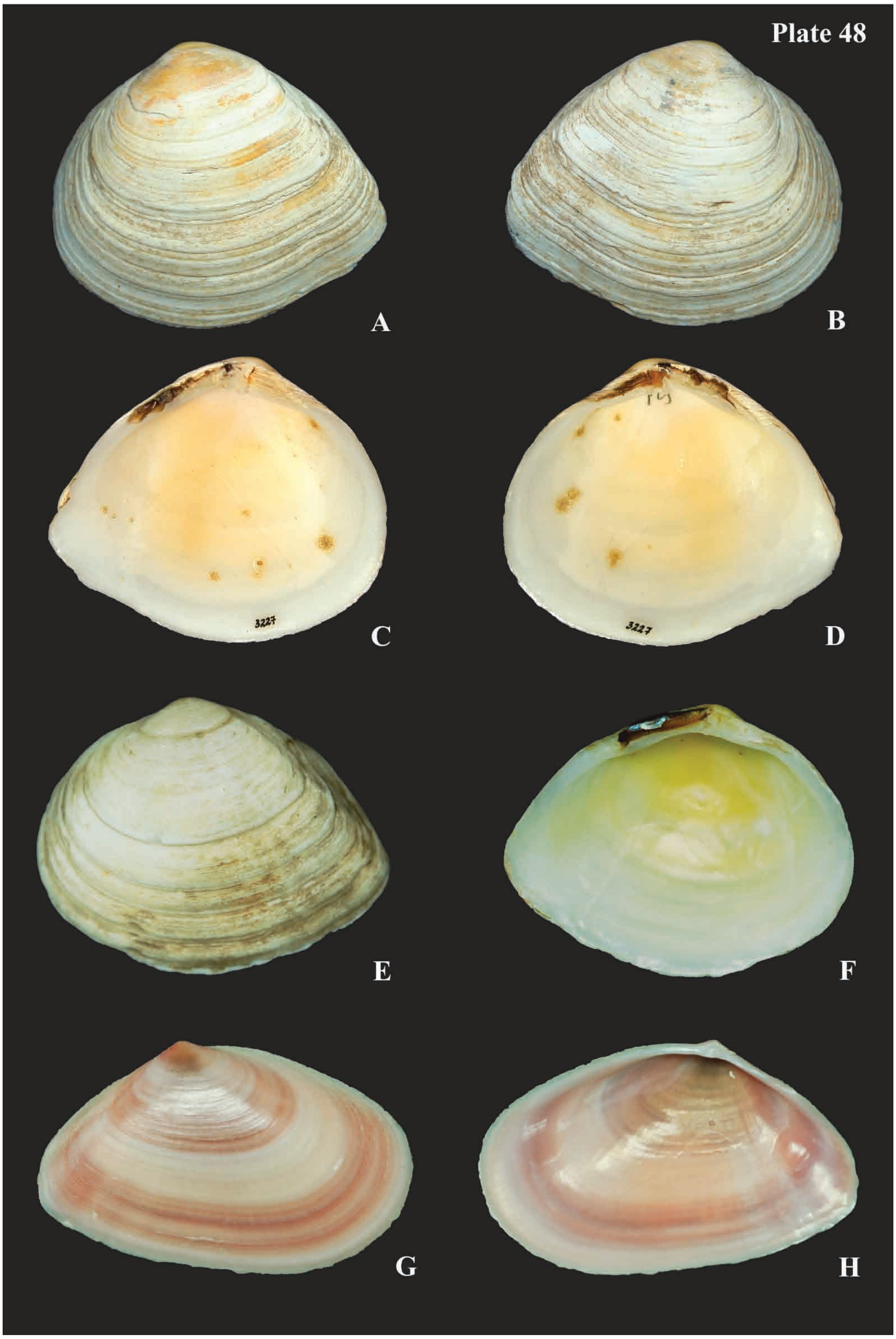
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Plate 49

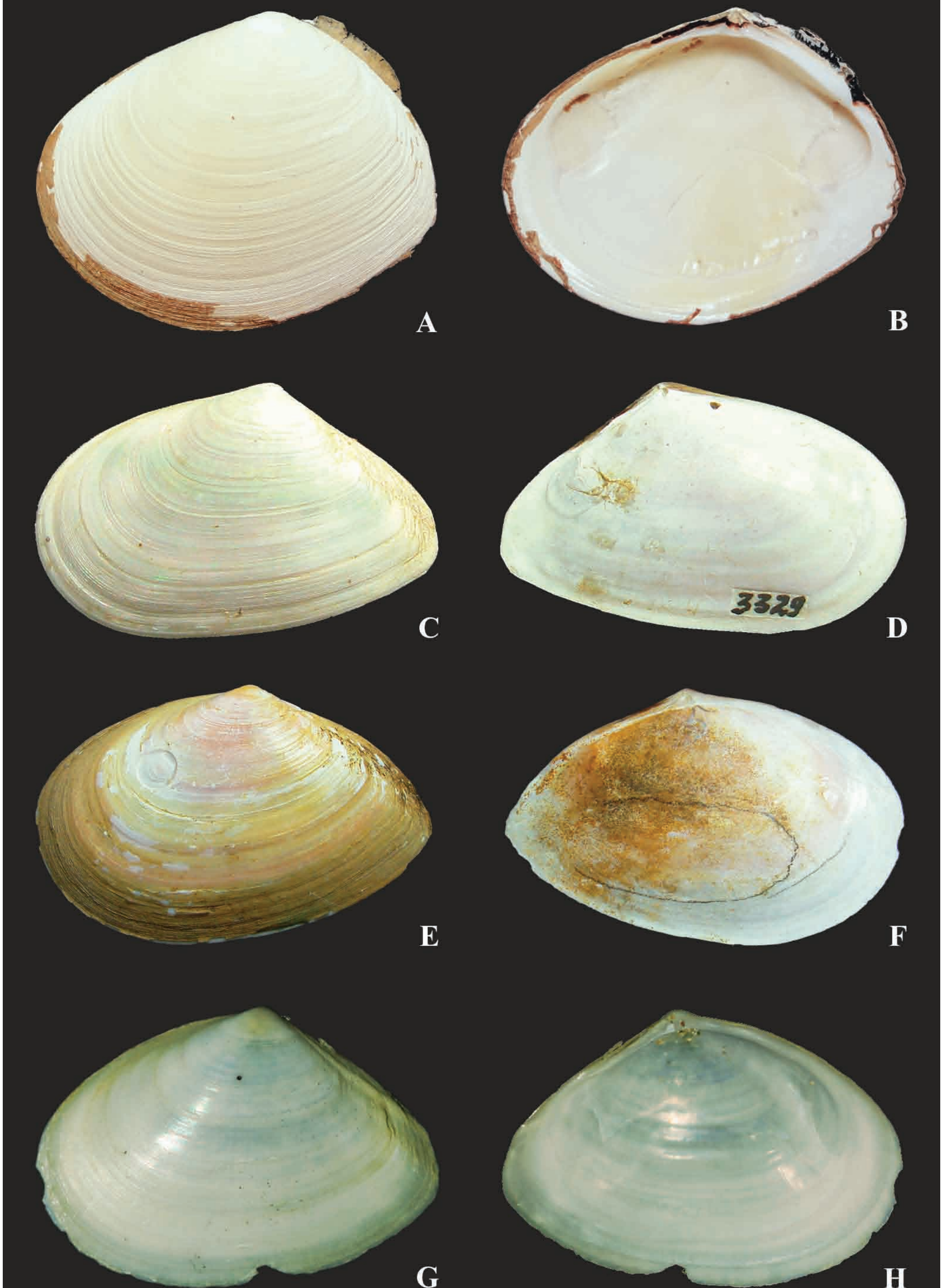
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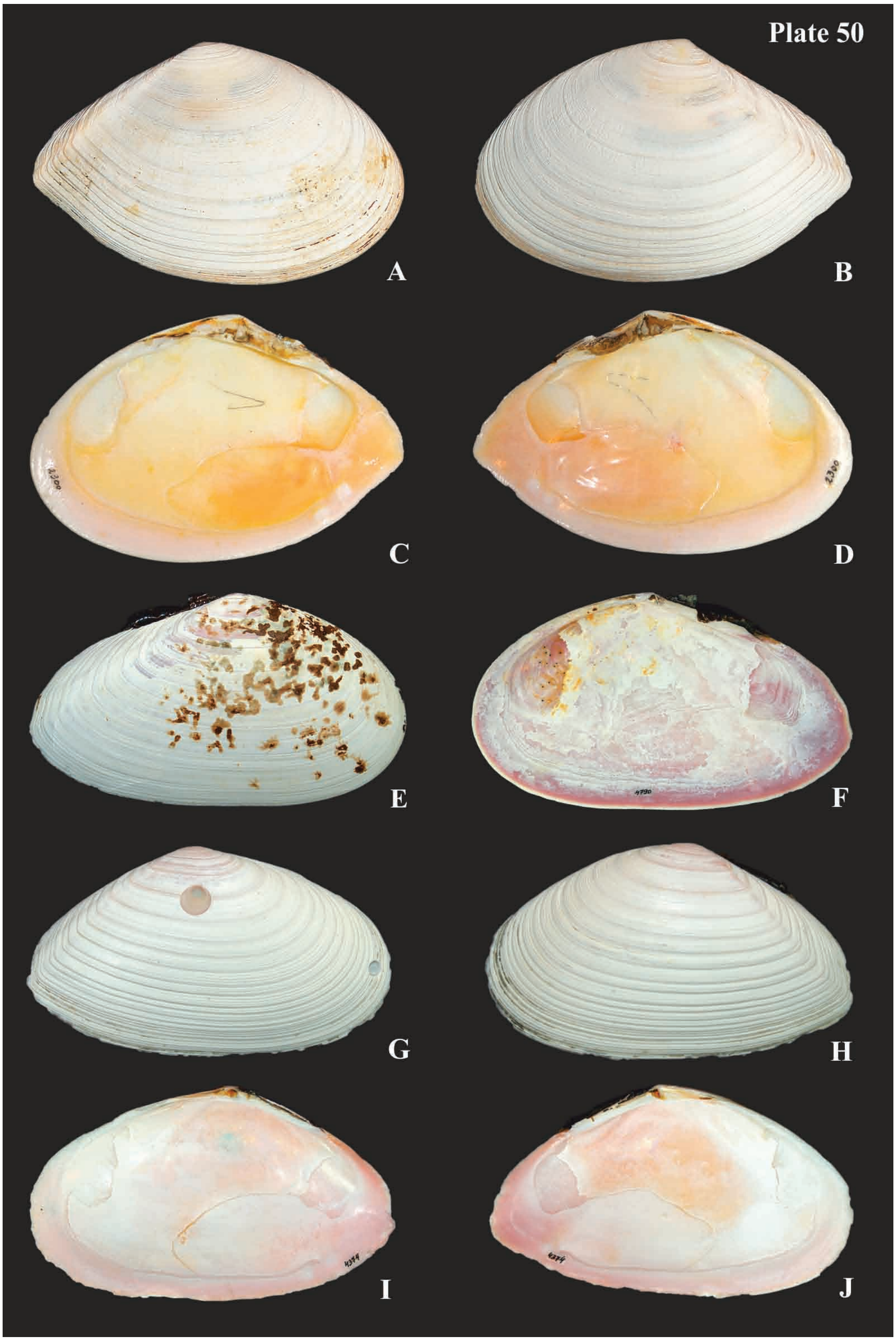
Plate 50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Explanations of Plates 51–55

Plate 51

Figs. A–D. *Gari* (*Gobraeus*) *kazusensis* (Yokoyama, 1922). **SP**: Peter the Great Bay, Putyatina Is., length 53.5 mm, ZMFU 27582/Bv-4624.

Figs E–H. *Nuttallia commoda* (Yokoyama, 1925). **SP**: Peter the Great Bay, off Cape Gamova, depth 50 m, length 99.5 mm, ZMFU 19372/Bv-2843.

Plate 52

Figs. A–D. *Nuttallia ezonis* Kuroda et Habe in Habe, 1955. **SP**: Peter the Great Bay, south-western part, Cape Ostrovok Falshivy, length 49 mm, ZMFU 10402/Bv-759.

Figs E–H. *Nuttallia obscurata* (Reeve, 1857). **MNP**: Olga Bay, length 37 mm, ZMFU 10166/Bv-596.

Plate 53

Figs. A, B. *Soletellina atrata* Deshayes in Reeve, 1857. **SK**: Busan, Haeundae Beach, length 69 mm, ZMFU 28791/Bv-4910.

Figs. C–F. *Theora* (*Endopleura*) *lubrica* A.A. Gould, 1861. **SK**: Yeongil Bay, depth 19.5 m, length 6 mm, ZMFU 20224/Bv-3124.

Figs. G–J. *Solen* (*Ensisolen*) *krusensterni* Schrenck, 1867. **SP**: Possjet Bay, Mramornaya Bay, length 79.2 mm, ZMFU 8964/Bv-64.

Figs. K, L. *Solen* (*Solen*) *gordonis* Yokoyama, 1920. **SK**: Busan, Haeundae Beach, length 83 mm, ZMFU 28790/Bv-4909.

Figs. M, N. *Solen* (*Solen*) *strictus* Gould, 1861. **SP**: Ussuriysky Bay, Sukhodol Bay, near Kangauz River mouth, length 118 mm, ZMFU 10132/Bv-567.

Figs. O, P. *Siliqua alta* (Broderip et Sowerby I, 1829). **SP**: Possjet Bay, Reid Pallada Bay, length 61 mm, ZMFU 8977/Bv-78.

Plate 54

Figs. A, B. *Siliqua pulchella* (Dunker, 1852). **SK**: Yeongil Bay, depth 8.5 m, length 20.7 mm, ZMFU 19310/Bv-2803.

Figs. C, D. *Lutraria sieboldii* Deshayes, 1854: **SK**: Busan, Haeundae Beach, length 68.2 mm, ZMFU 28790/Bv-4909.

Figs. E–H. *Mactra* (*Mactra*) *chinensis* Philippi, 1846. **SP**: Ussuriysky Bay, Gornostay Bay, length 54 mm, ZMFU 20382/Bv-3223.

Figs. I, J. *M.* (*M.*) *chinensis* Philippi, 1846. **SK**: Busan, Gwangalli Beach, length 40 mm, RGN collection.

Plate 55

Figs. A–D. *Mactra* (*Mactra*) *quadrangularis* Deshayes in Reeve, 1854. **SP**: Ussuriysky Bay, inner part, near Shkotovka River mouth, length 42.5 mm, ZMFU 10399/Bv-756.

Figs. E, F. *Mactra* sp. **SK**: Busan, Gwangalli Beach, length 30 mm, RGN collection.

Figs. G, H. *Tresus keenae* (Kuroda et Habe, 1950). **SK**: Yeongil Bay, depth 1 m, length 122.6 mm, ZMFU 19309/Bv-2802.

Plate 51

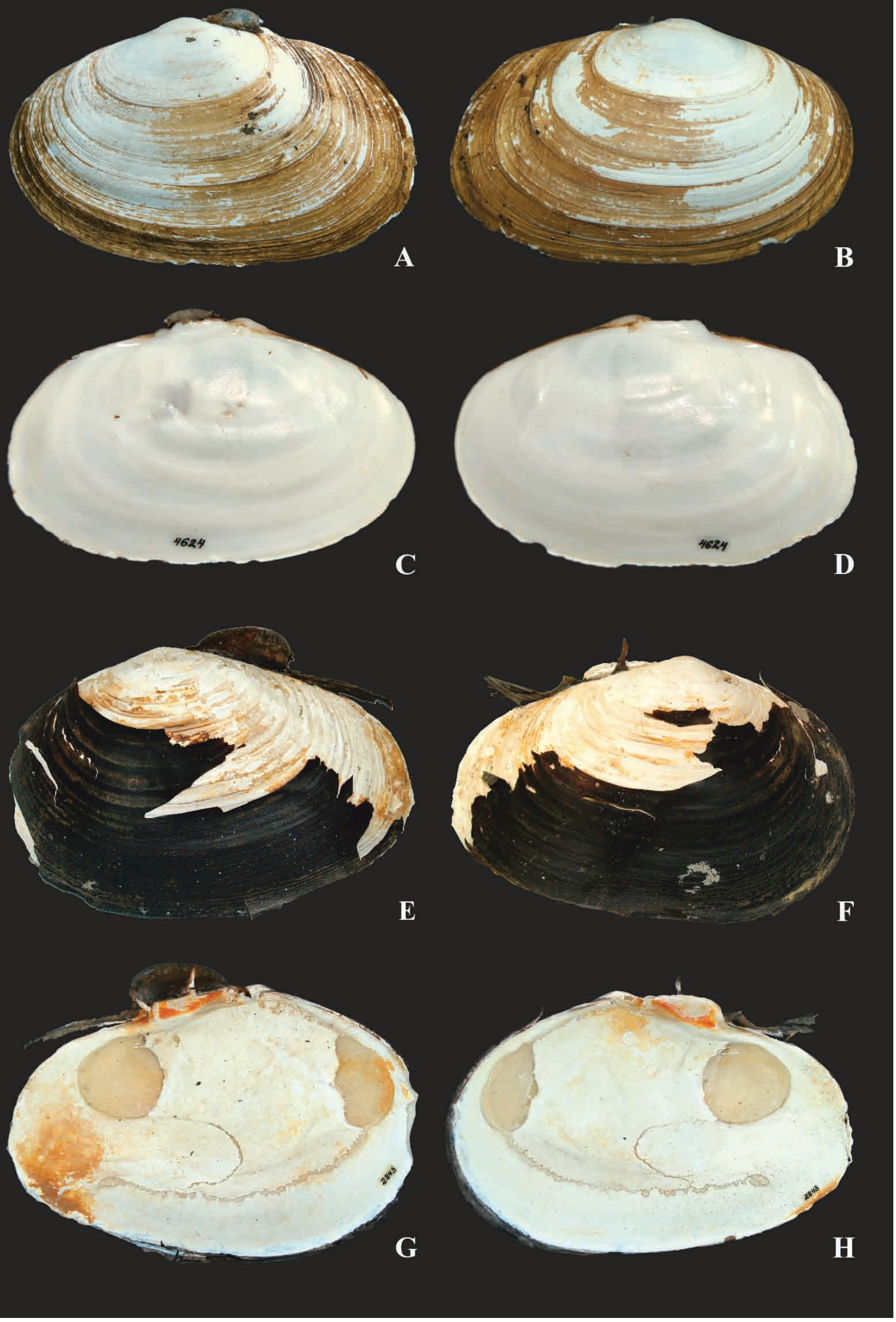
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Plate 52

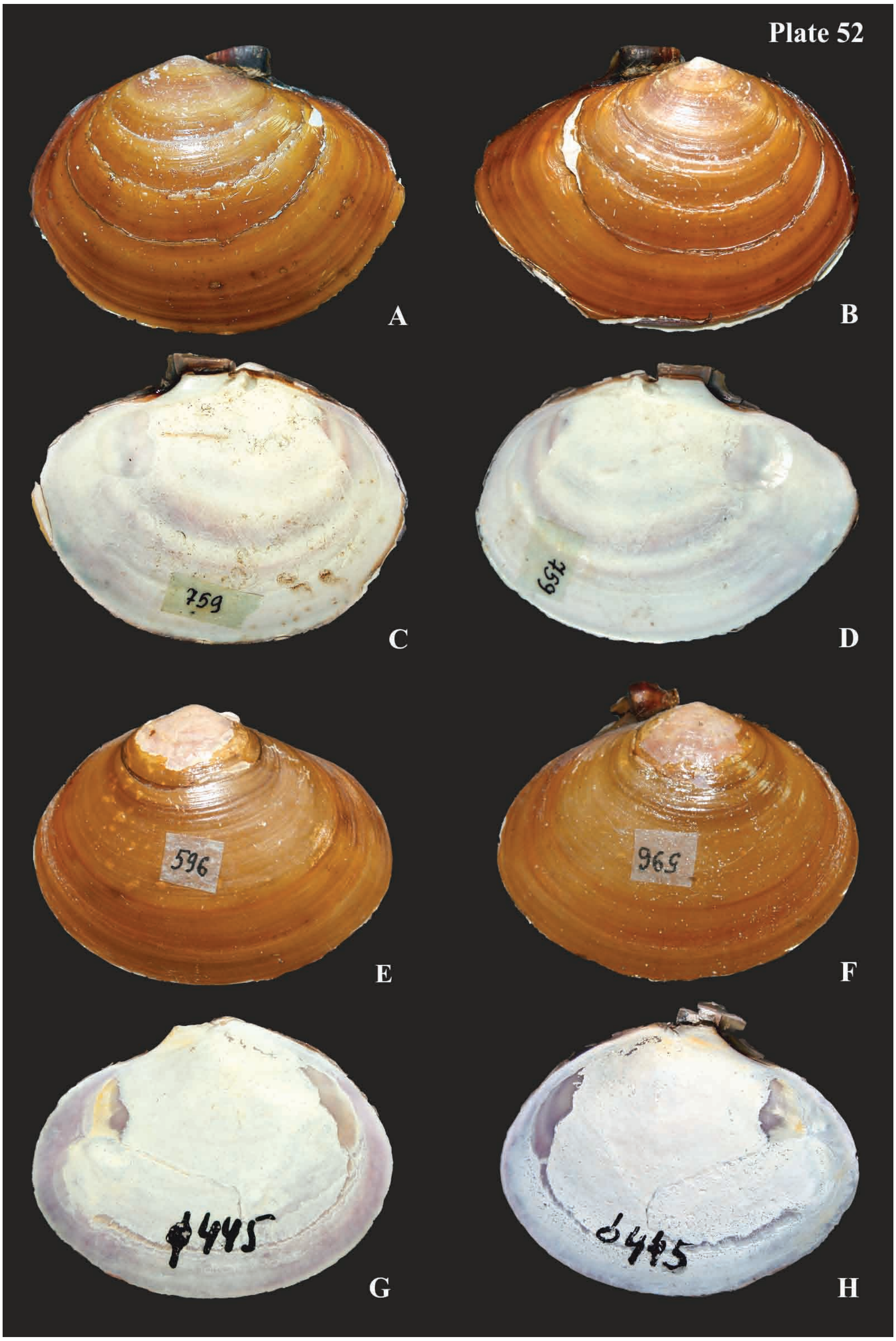
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Plate 53

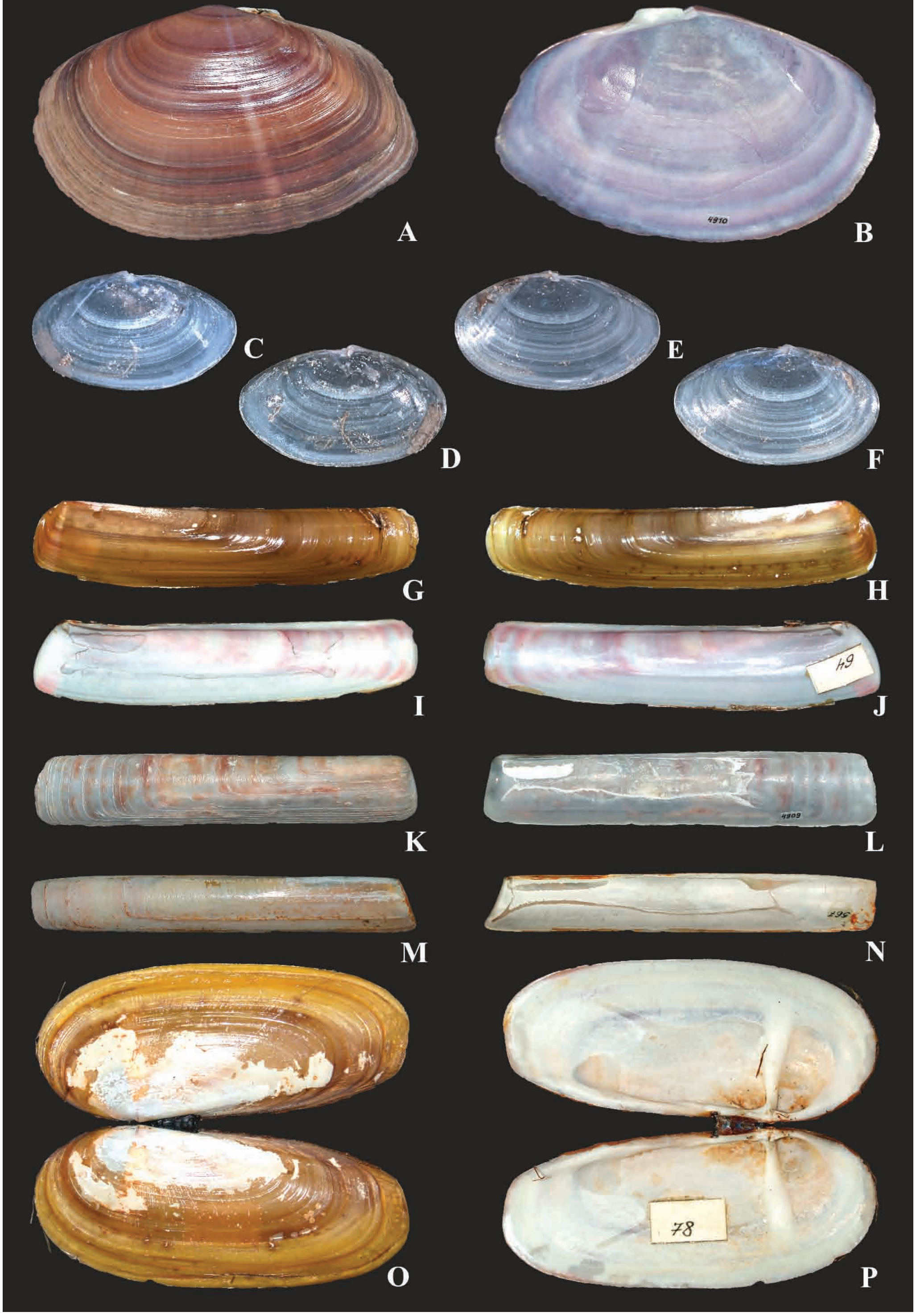
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Plate 54

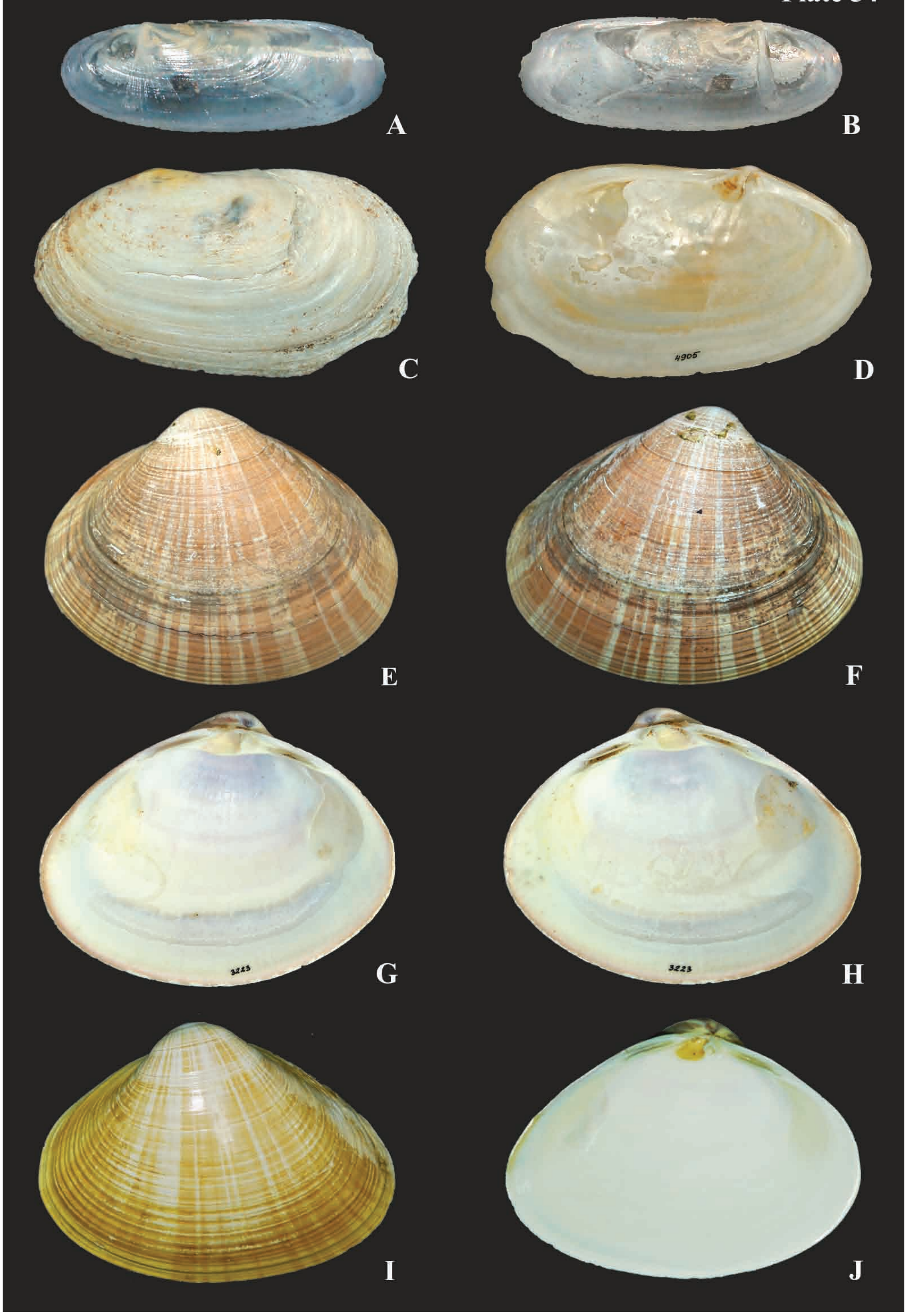
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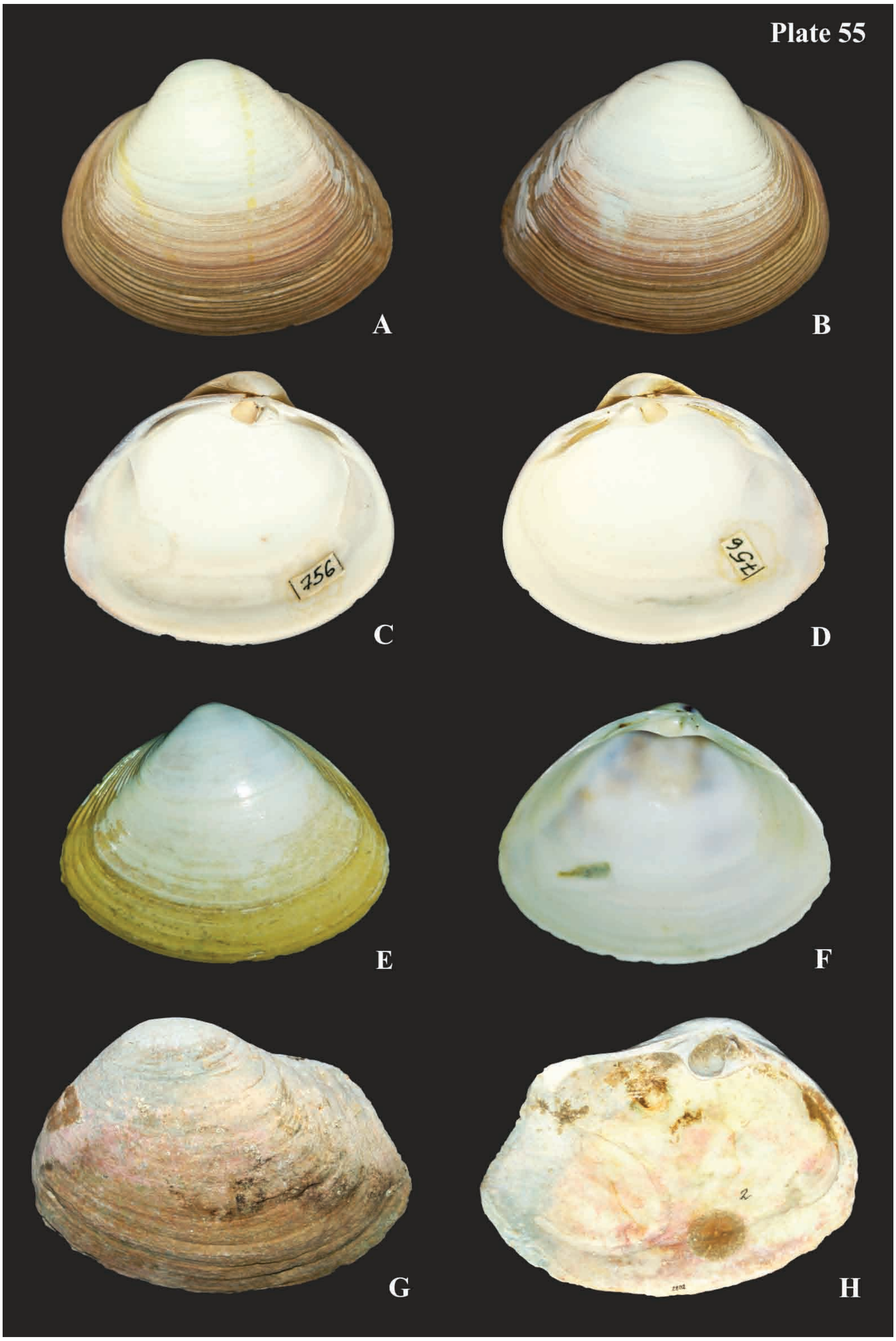
Plate 55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Explanations of Plates 56–60

Plate 56

Figs. A–D. *Mactromeris polynyma* (Stimpson, 1860). **SP**: Possjet Bay, Vityaz Bay, depth 1.5 m, length 62.1 mm, ZMFU 27494/Bv-4562.

Figs. E–H. *Spisula* (*Pseudocardium*) *sachalinensis* (Schrenck, 1861). **SP**: Possjet Bay, Vityaz Bay, depth 1.5 m, length 103.8 mm, ZMFU 27495/Bv-4563.

Plate 57

Figs. A–D. *Raeta* (*Raetellops*) *pulchella* (Adams et Reeve, 1850). **SP**: Ussuriysky Bay, inner part, length 18.9 mm, ZMFU 9110/Bv-106.

Figs. E, F. *Mya* (*Mya*) *truncata* L., 1758. **SP**: Peter the Great Bay, near Reineke Is., depth 40 m, length 24.3 mm, ZMFU 18231/Bv-2542.

Gigs. G, H. *Cryptomya busoensis* (Yokoyama, 1922). **SP**: Amursky Bay, depth 6 m, length 12.1 mm, ZMFU 27811/Bv-4730.

Figs. I, J. *Paramya recluzi* (A. Adams, 1864). **SK**: Yeongil Bay, depth 8.5 m, length 10.5 mm, ZMFU 20404/Bv-3242.

Plate 58

Figs. A–D. *M.* (*M.*) *truncata* L., 1758. **SP**: Possjet Bay, depth 24 m, length 68.2 mm, ZMFU 22981/Bv-3716.

Figs. E–H. *Mya* (*Mya*) *uzenensis* Nomura et Zinbo, 1937. **SP**: Ussuriysky Bay, between Cape Zeleny and Desantnaya Bay, length 75.1 mm, ZMFU 10138/Bv-573.

Plate 59

Figs. A–D. *Mya* (*Arenomya*) *japonica* Jay, 1857. **SP**: Amursky Bay, near Sedanka River mouth, length 89.5 mm, ZMFU 10071/Bv-516.

Figs. E–H. *Potamocorbula amurensis* (Schrenck, 1861). **SP**: Ussuriysky Bay, inner part, near Shkotovka River mouth, length 24.7 mm, ZMFU 10371/Bv-739.

Fig. I. *Anisocorbula venusta* (Gould, 1861). **MNP**: Petrova Is., depth 30 m, length 7.4 mm, ZMFU 10374/Bv-742.

Figs. J, K. *Hiatella arctica* (L., 1767) s.l. **MNP**: Tatarsky Strait, near Cape Sosunova, depth 124 m, length 24.7 mm, ZMFU 19174/Bv-2719.

Plate 60

Figs. A–D. *Panomya ampla* Dall, 1898. Russian part of the Sea of Japan/East Sea, depth 140–160 m, length 61.3 mm, ZMFU 10707/Bv-972.

Figs. E–H. *Panomya norvegica* (Spengler, 1793). **SP**: Possjet Bay, Novgorodskaya Bay, depth 3–5 m, length 64.8 mm, ZMFU 8960/Bv-60.

Plate 56

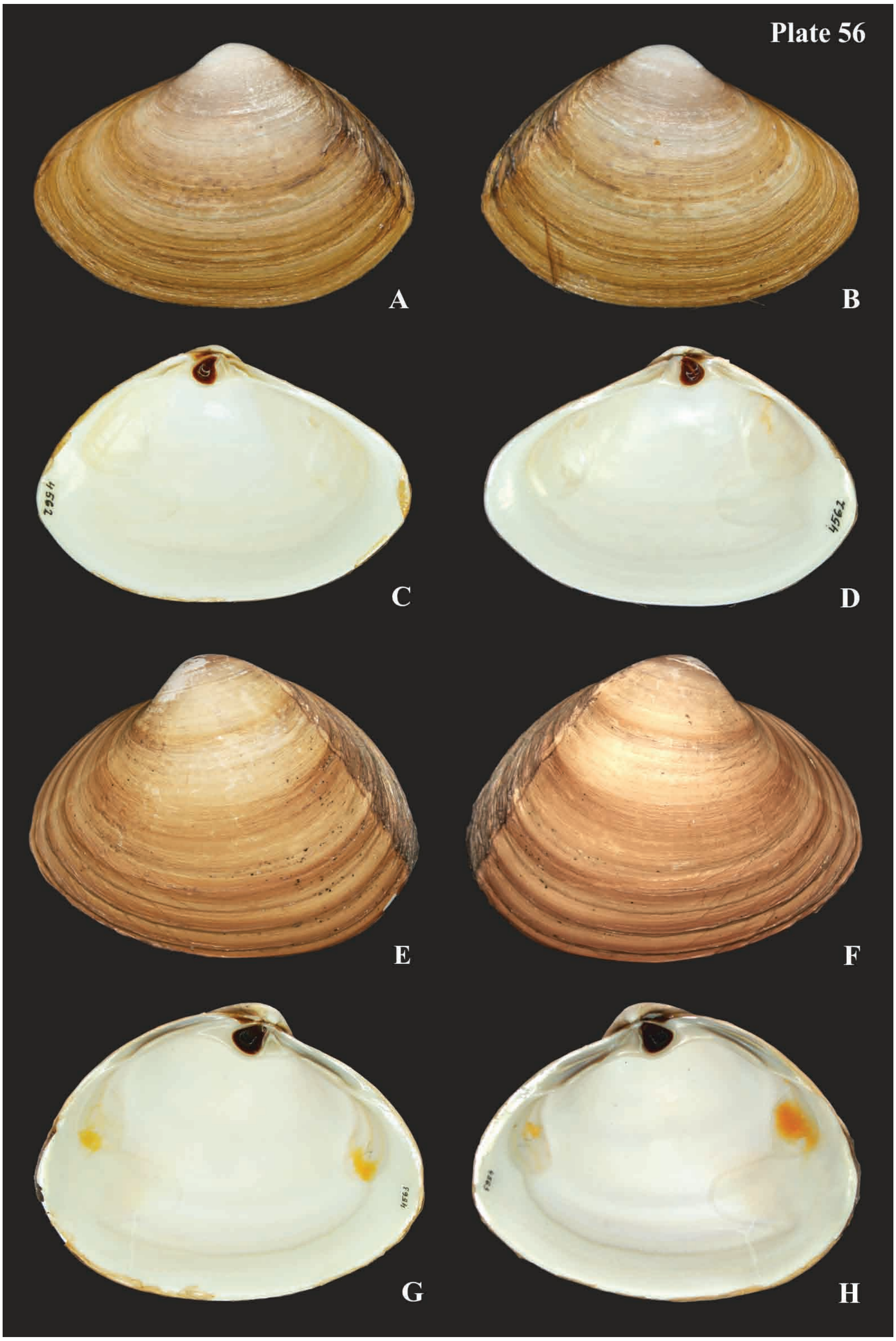
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Plate 57

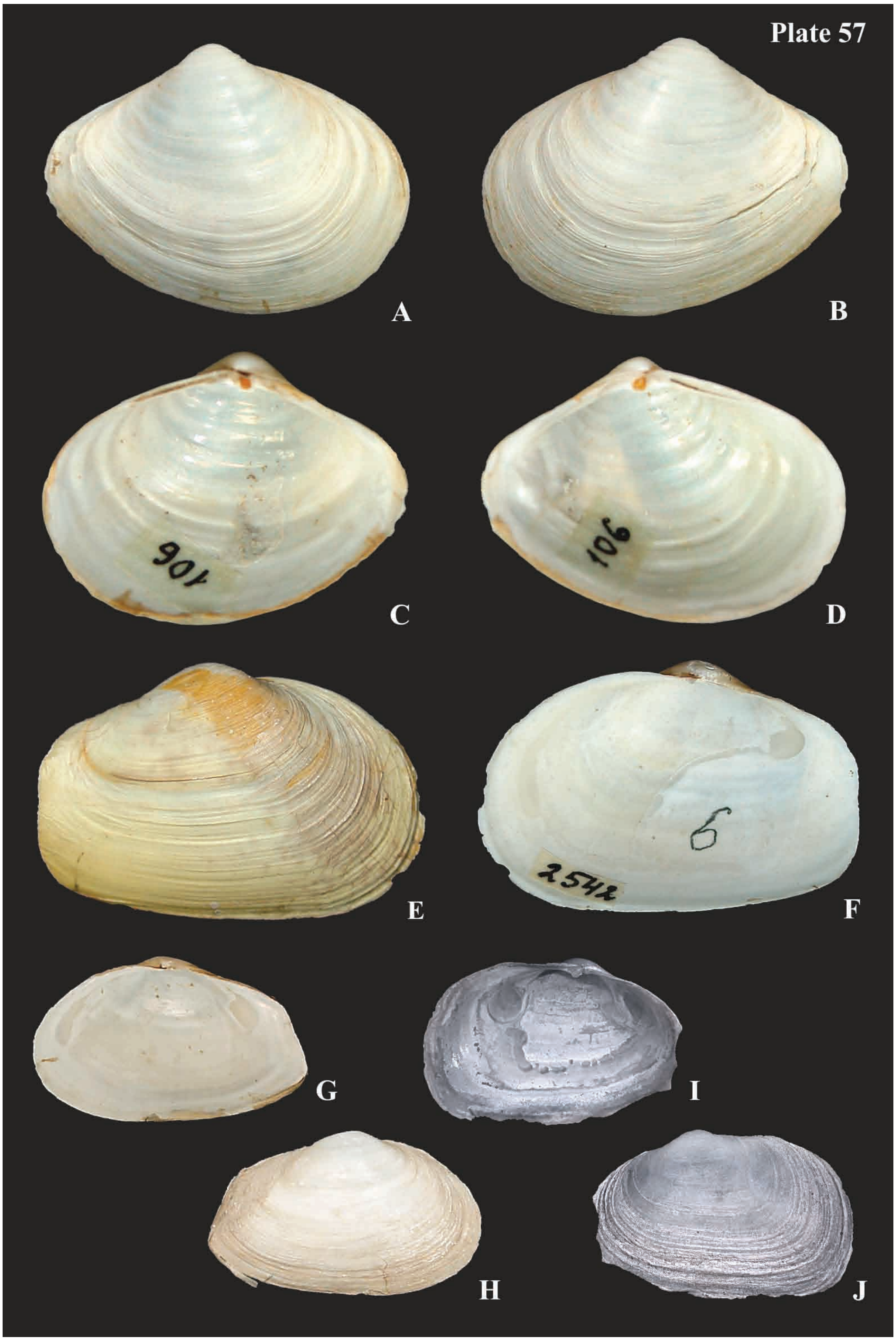
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Plate 58

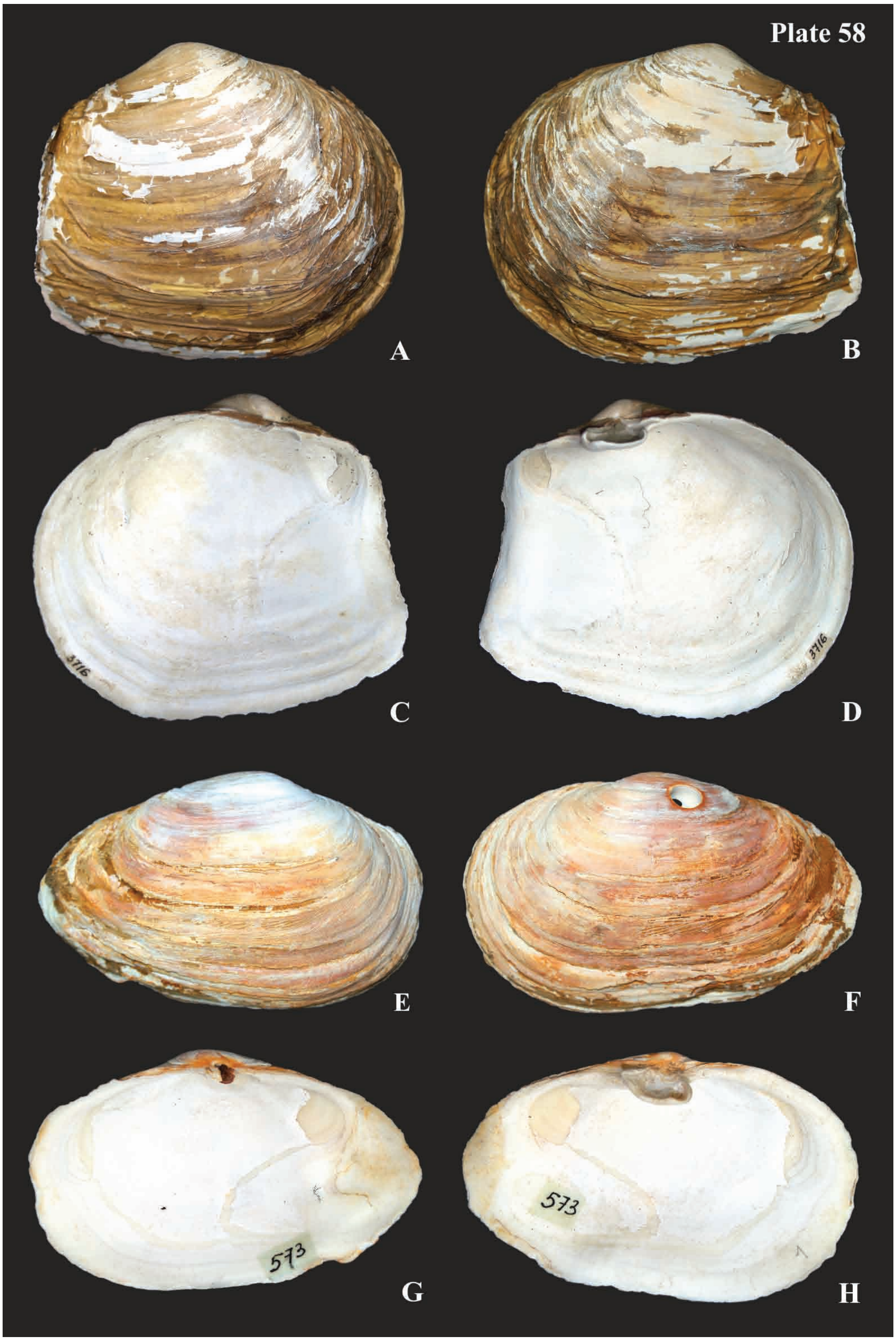
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Plate 59

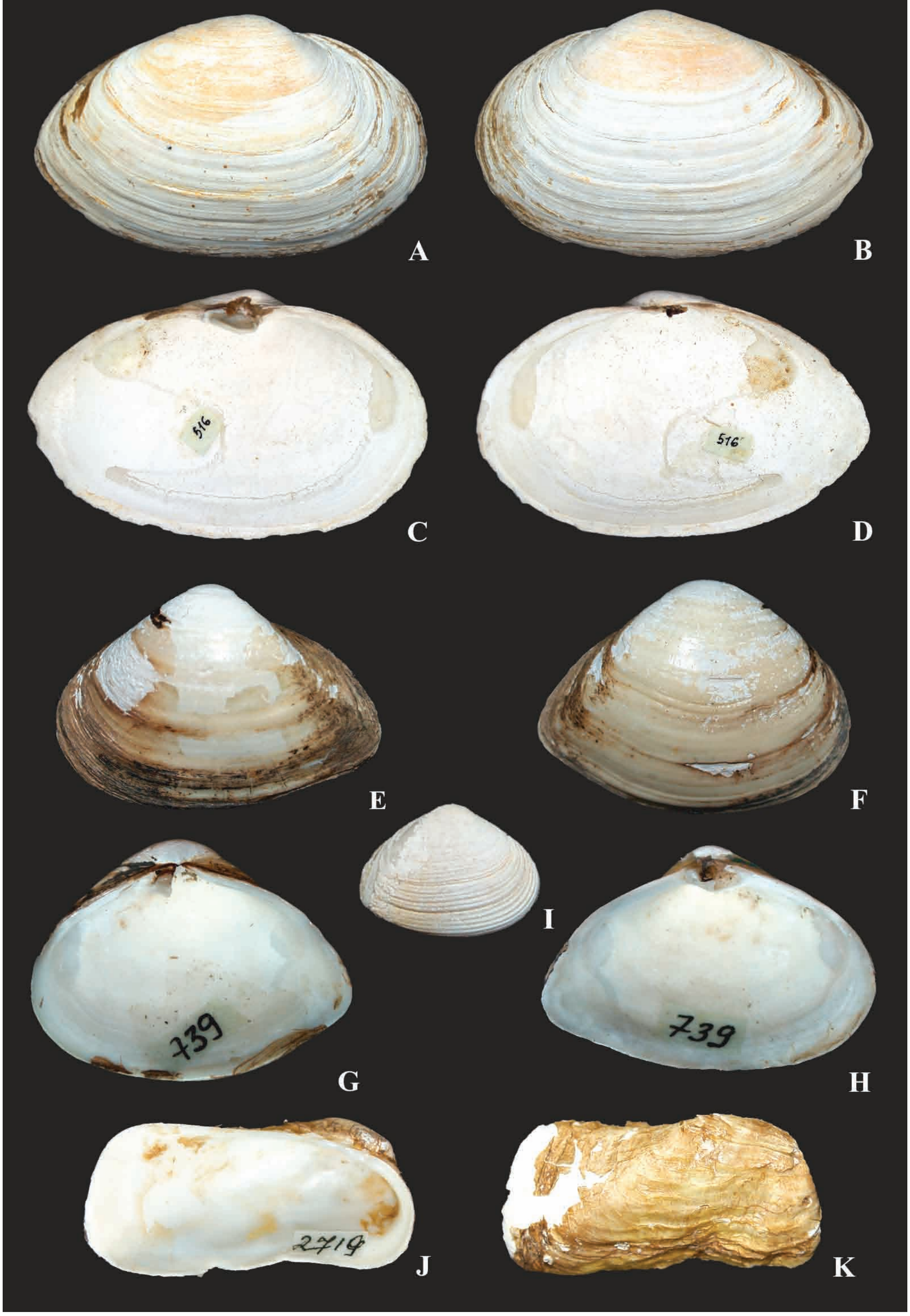
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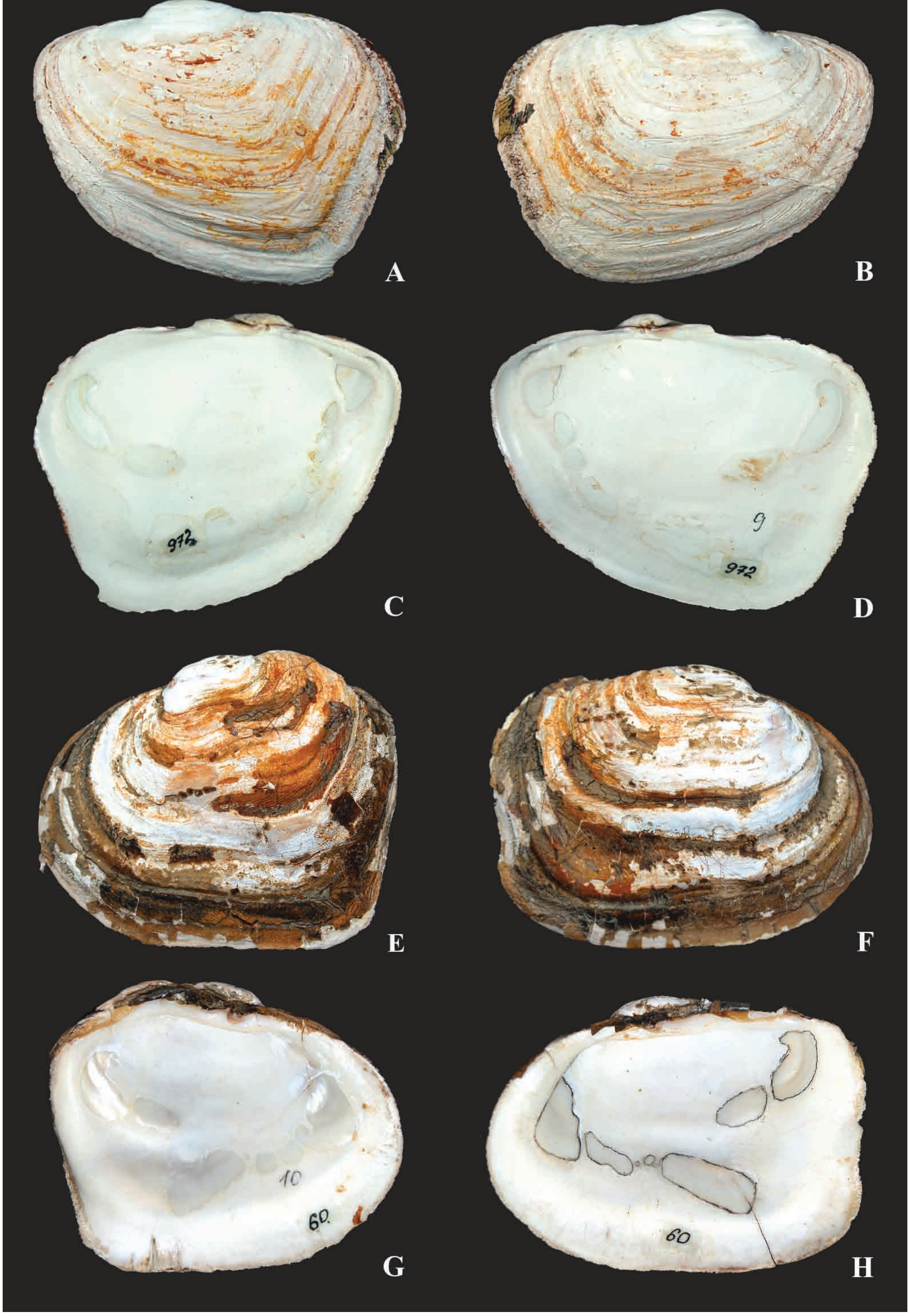
Plate 60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60.
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Explanations of Plates 61–65

Plate 61

Figs. A–D. *Panomya nipponica* Nomura et Hatai, 1935. **MNP**: Dzhigit Bay, length 53.3 mm, ZMFU 27699/Bv-4650.

Figs. E–H. *P. norvegica* (Spengler, 1793). **MNP**: Dzhigit Bay, length 61.1 mm, ZMFU 27698/Bv-4649.

Plate 62

Figs. A–D. *Panopea japonica* A. Adams, 1850. **SP**: Peter the Great Bay, Klerka Peninsula, length 100.7 mm, ZMFU 22665/Bv-3614.

Figs. E, F. *Barnea* (*Umitakea*) *japonica* (Yokoyama, 1920). **SP**: Peter the Great Bay, length 48.3 mm, ZMFU 9353/Bv-249.

Figs. G–J. *Barnea* (*Anchomasa*) *manilensis* (Philippi, 1847) **SP**: Peter the Great Bay, Antipenko Is., depth 8 m, length 48.2 mm, ZMFU 9354/Bv-250.

Plate 63

Figs. A, B. *Penitella kamakurensis* (Yokoyama, 1922). **SK**: Gyeongbuk Province, near Chukpyon (Jukbyeon), length 33.4 mm, ZMFU 19383/Bv-2854.

Figs. C, D. *Zirfaea* cf. *pilsbryi* Lowe, 1931. **SP**: Peter the Great Bay, south-western part, Cape Ostrovok Falshivy, length 67.9 mm, ZMFU 9527/Bv-324.

Figs. E, F. *Bankia* (*Bankia*) *setacea* (Tryon, 1863). **SP**: Peter the Great Bay, Boysmana Bay, length 5 mm, ZMFU 11761/Bv-1502.

Figs. G, H. *Myadoropsis transmontana* (Yokoyama, 1922). **SK**: Yeongil Bay, depth 25 m, length 11.3 mm, ZMFU 19311/Bv-2804.

Figs. I, J. *Myadora japonica* Habe, 1950. **SK**: Yeongil Bay, depth 25 m, length 15.8 mm, ZMFU 19312/Bv-2805.

Figs. K–N. *Myadora reeveana* (Smith, 1880). **SK**: Yeongil Bay, depth 25 m, length 15.1 mm, ZMFU 19313/Bv-2806.

Plate 64

Figs. A–D. *Pandora* (*Pandorella*) *wardiana* A. Adams, 1860. **MNP**: Ezhovaya Bay, depth 50 m, length 47.4 mm, ZMFU 19151/Bv-2709.

Figs. E, F. *Pandora* (*Heteroclidus*) *pulchella* Yokoyama, 1926. **SP**: Peter the Great Bay, south-western part, Sivuchya Bay, length 52.4 mm, ZMFU 17684/Bv-2452.

Figs. G, H. *Lyonsia arenosa* (Möller, 1842). **SP/MNP**: off Cape Povorotny, length 14.6 mm, ZMFU 12948/Bv-1709.

Figs. I, J. *Lyonsia ventricosa* A.A. Gould, 1861. **SK**: Yeongil Bay, depth 22.5 m, length 24.2 mm, ZMFU 19317/Bv-2810.

Plate 65

Figs. A–D. *Lyonsia nuculanoformis* Scarlato in Volova et Scarlato, 1980. **SK**: Yeongil Bay, depth 27.5 mm, length 29.8 mm, ZMFU 19316/Bv-2809.

Figs. E–H. *Lyonsia nuculanoformis* Scarlato in Volova et Scarlato, 1980. **SP**: Possjet Bay, Reid Pallada Bay, Churkhado (Nazimova) Spit, length 21.4 mm, ZMFU 11402/Bv-1389.

Figs. I–L. *Entodesma navicula* (A. Adams et Reeve, 1850). **SP**: Possjet Bay, Aleut Bay, length 50.5 mm, ZMFU 16492/Bv-2246.

Plate 61

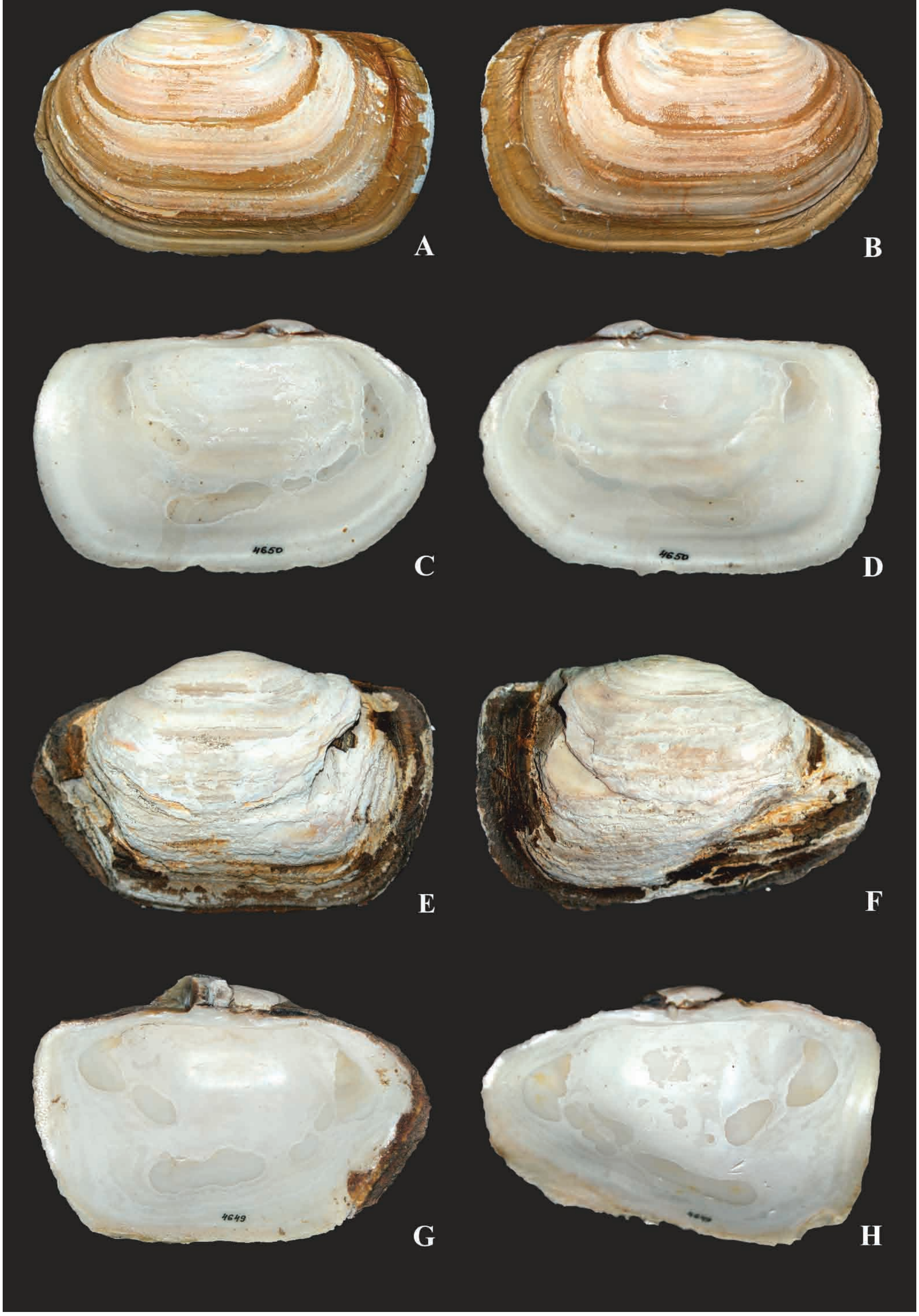
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Plate 62

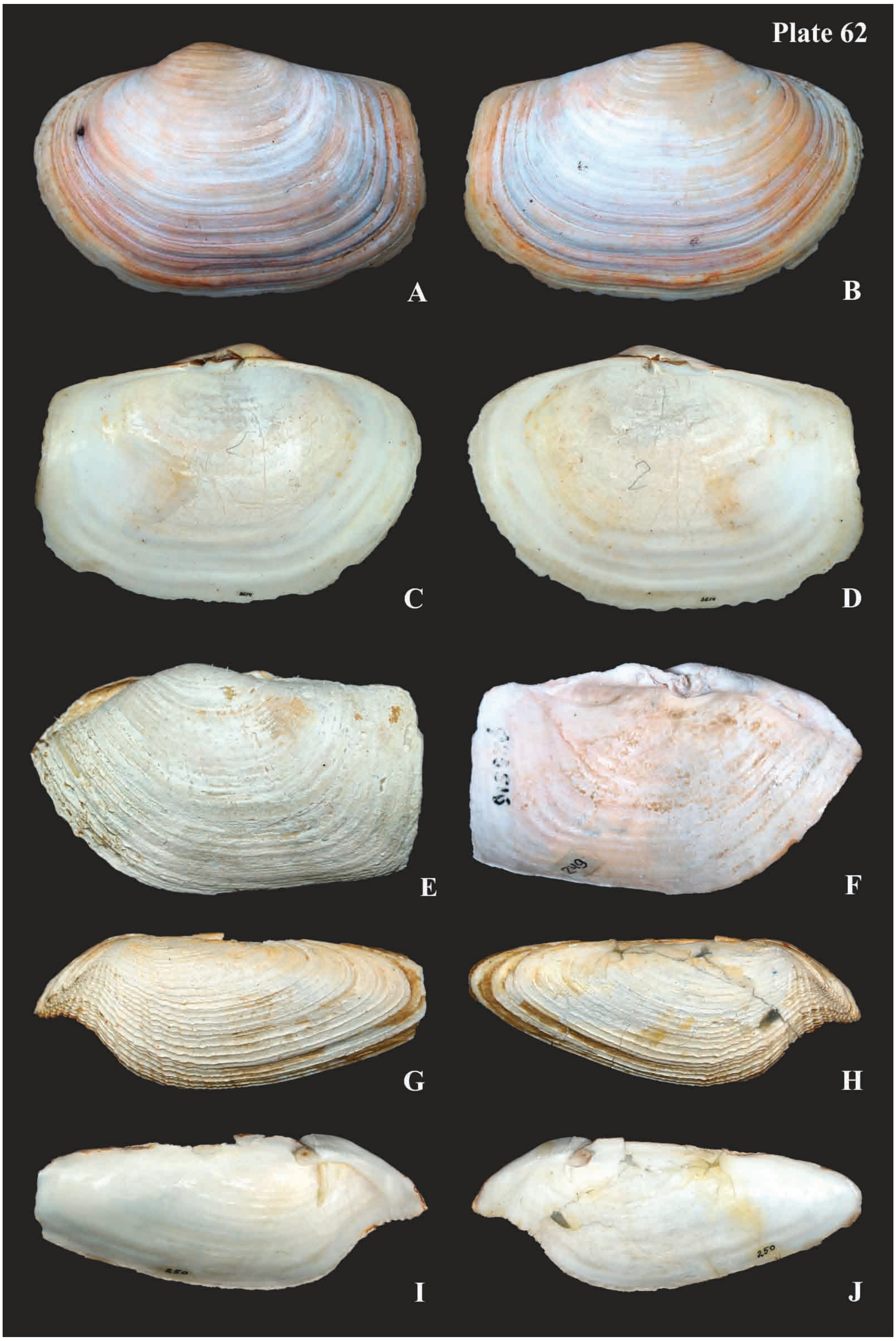
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Plate 63

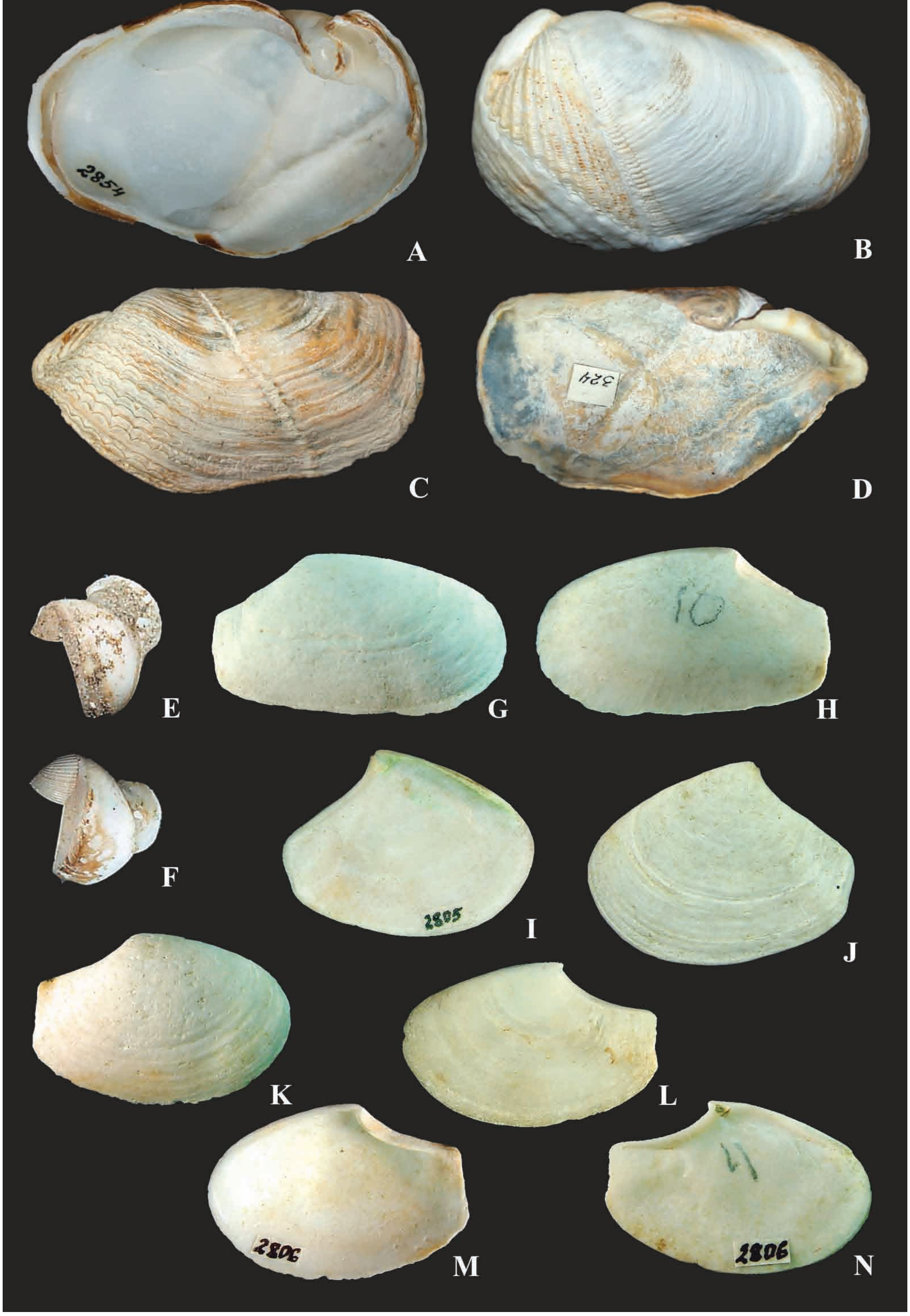
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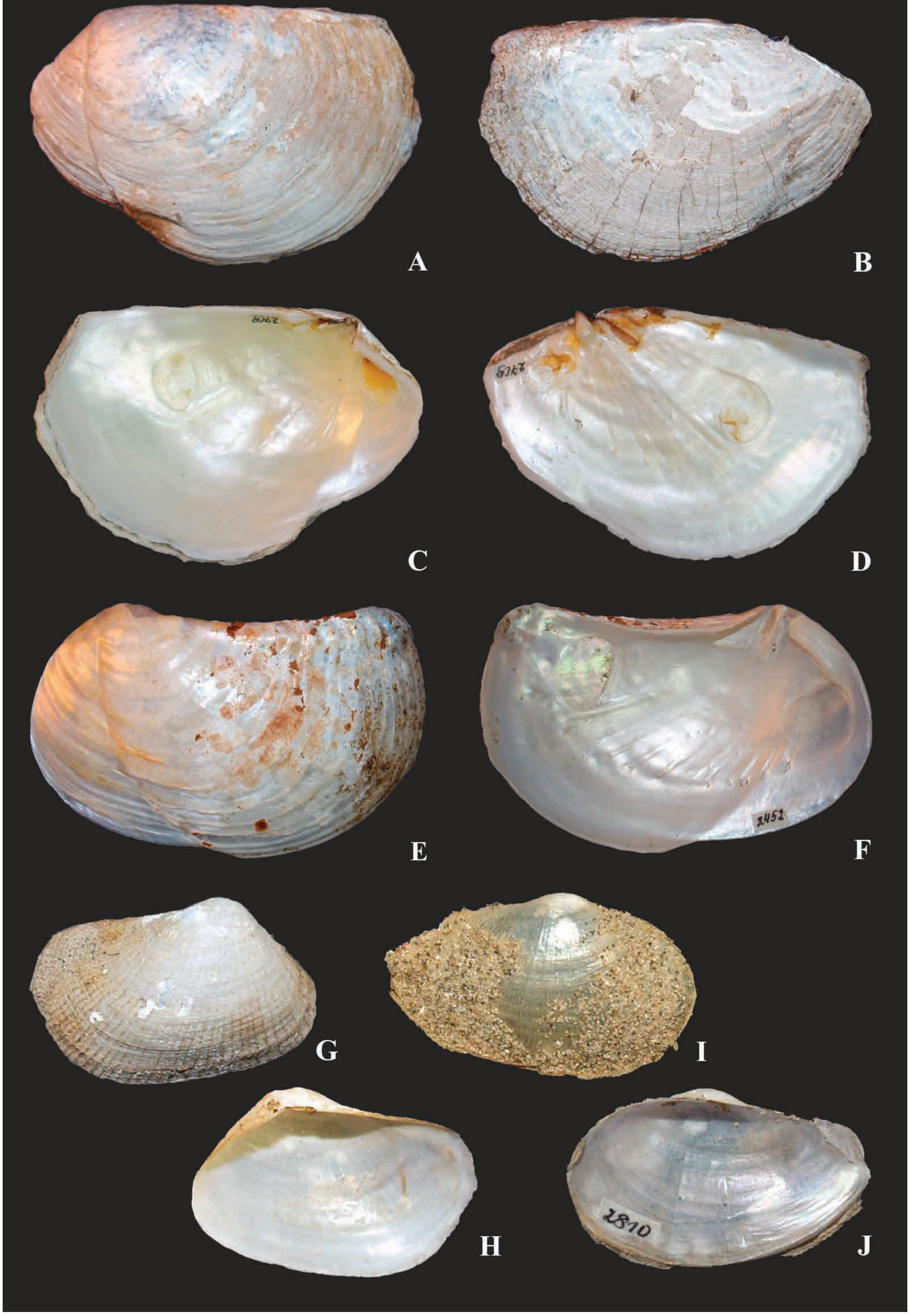
Plate 64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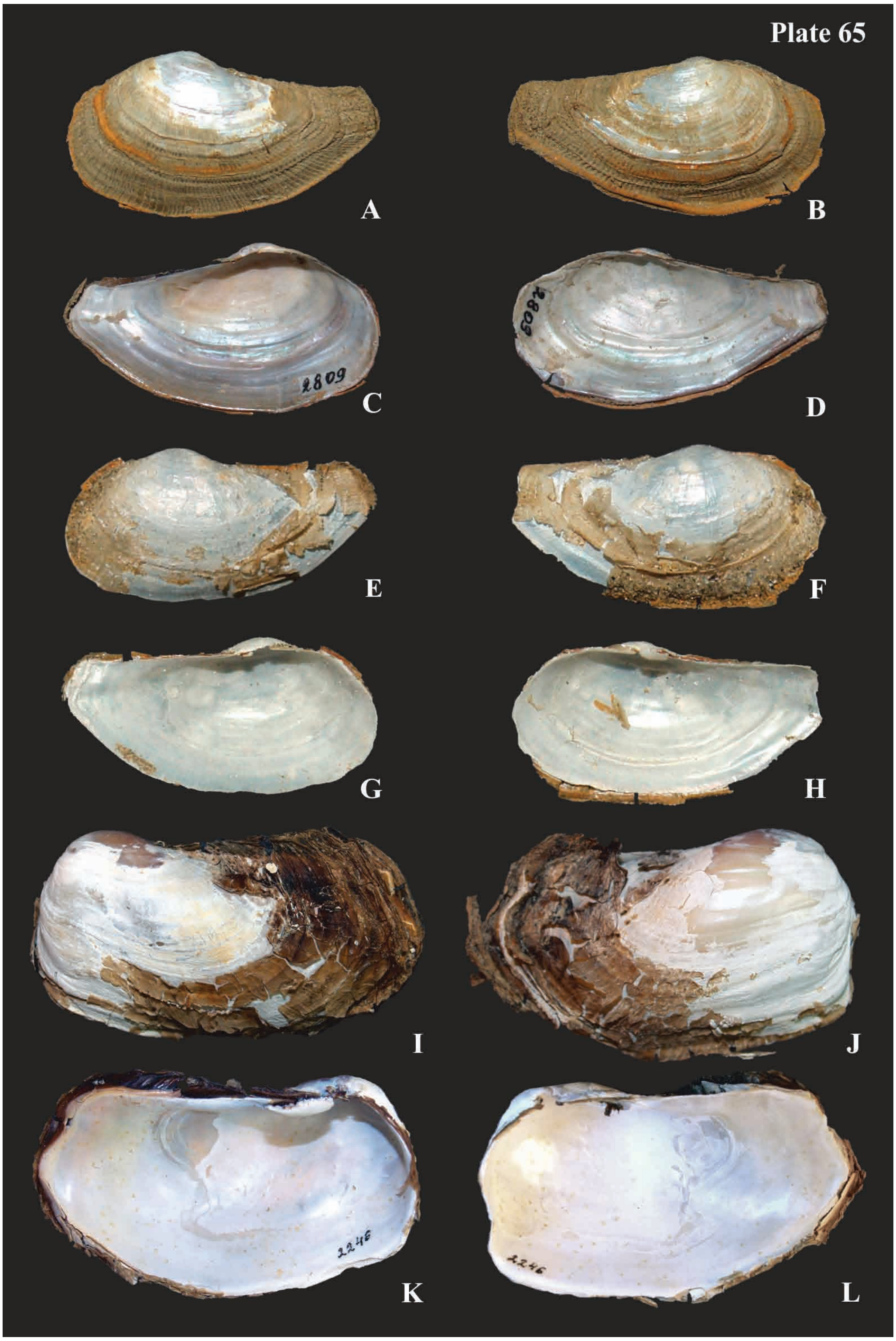

Plate 65

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Explanations of Plates 66, 67

Plate 66

Figs. A–D. *Thracia* (*Homoeodesma*) *itoi* Habe, 1961. **SP**: Peter the Great Bay, Anna Bay, depth 8 m, length 39.6 mm, ZMFU 9186/Bv-182.

Figs. E, F. *Thracia* (*Homoeodesma*) *kakumana* (Yokoyama, 1927). **SP**: Ussuriysky Bay, Lazurnaya (Shamora) Bay, length 58.2 mm, ZMFU 27932/Bv-4791.

Figs. G–J. *Laternula* (*Exolaternula*) *marilina* (Reeve, 1860). **SP**: Vostok Bay, mouth of Volchanets River, length 51.2 mm, ZMFU 26209/Bv-4392.

Plate 67

Figs. A, B. *Laternula* (*Laternula*) *anatina* (L., 1758). **SK**: Yeongil Bay, depth 19.5 m, ZMFU 20499/Bv-3258.

Figs. C, D. *Cardiomya behringensis* (Leche, 1883). **SP/MNP**: Sea of Japan/East Sea, depth 728–1100 m, length 10.1 mm, ZMFU 14194/Bv-1773.

Fig. E. *Cardiomya gouldiana* (Hinds, 1843). **SP/MNP**: Sea of Japan/East Sea, length 4.9 mm, ZMFU 14189/Bv-1768.

Figs. F, G. *Cuspidaria hindsiana* (A. Adams, 1864). **SK**: Yeongil Bay, depth 25 m, length 5.6 mm, ZMFU 19315/Bv-2808.

Figs. H–K. *Poromya castanea* Habe, 1952. **SP/MNP**: Sea of Japan/East Sea, depth 155 m, length 18.2 mm, ZMFU 12330/Bv-1582.

Plate 66

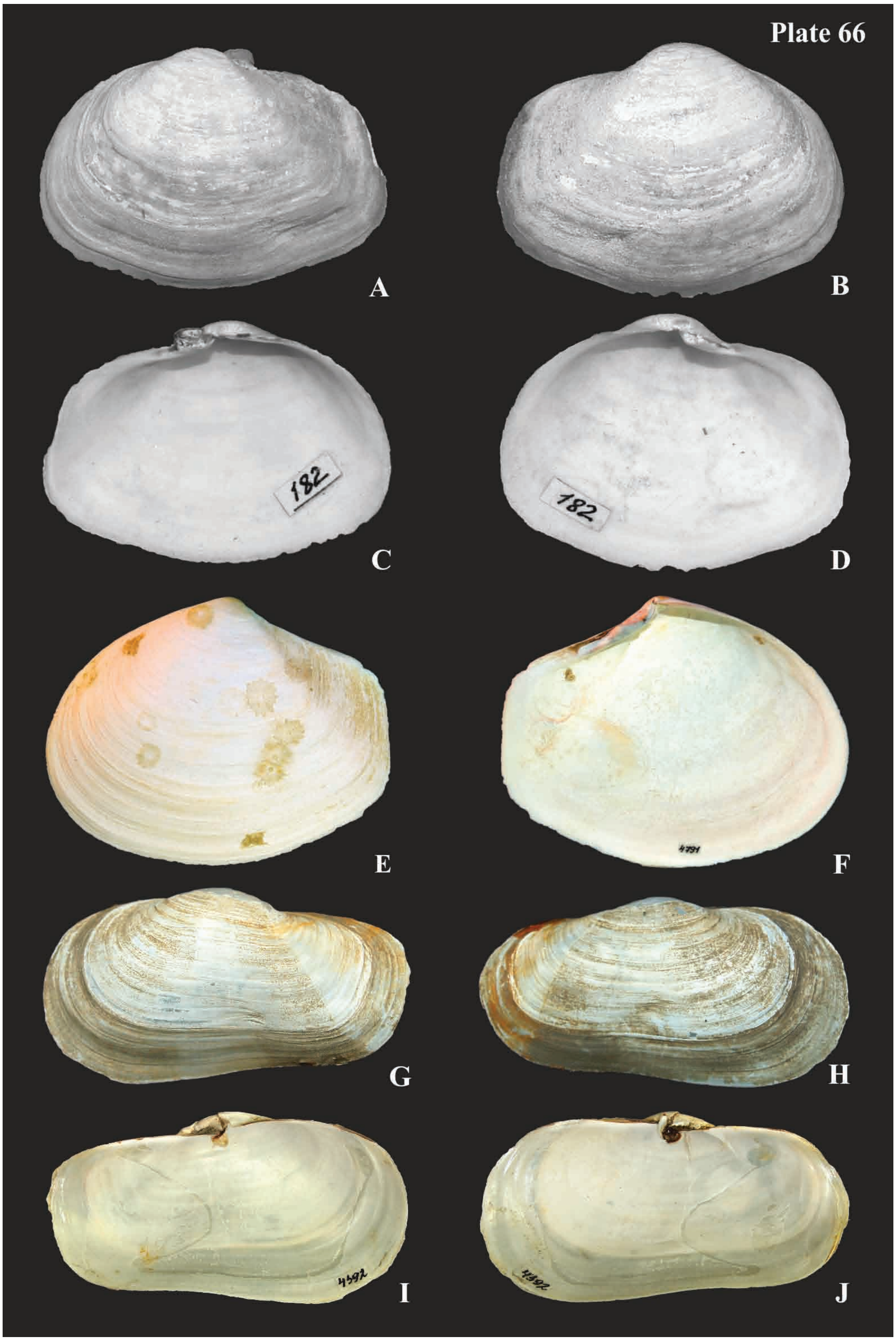
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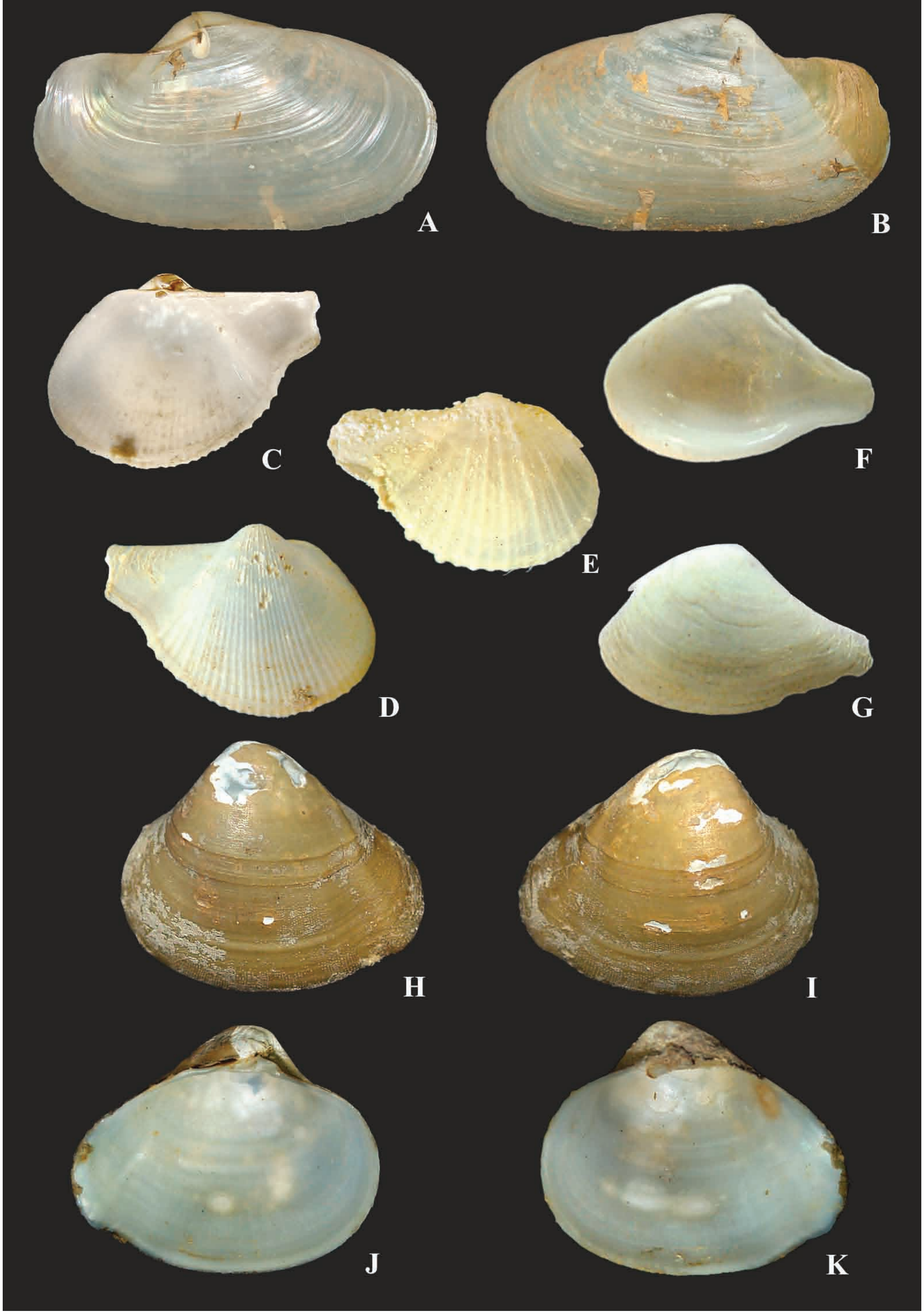
Plate 67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